UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CONSTANTINE JOHN ALEXOPOULOS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

MONDAY, MAY 23, 1932, 10 A. M.
Room 305, Natural History Building

COMMITTEE IN CHARGE:

PROFESSOR CHARLES F. HOTTES, *Chairman*
PROFESSOR HARRY W. ANDERSON
PROFESSOR JOHN T. BUCHHOLZ
PROFESSOR MAXWELL J. DORSEY
PROFESSOR WARREN A. RUTH
PROFESSOR FRANK L. STEVENS

Outline of Studies

Major Subject: Botany

Minor Subject: Horticulture

Thesis: A COMPARATIVE STUDY OF CERTAIN PYCNIDIAL FUNGI FROM VITIS

Summary

A comparison of the descriptions of some forty-four named form species of Phoma, Phyllosticta, and Macrophoma which have been described from Vitis, shows that the differences on which many of these specific descriptions have been based are very small. The work of a great number of investigators has shown that the characters which are used in limiting species in many groups of fungi do not remain stable under different enviromental conditions.

The experimental part of this work deals with a comparison of the behavior in culture, under different environmental conditions of a number of individuals of the genera Phoma and Phyllosticta which have been isolated from Vitis. The results of these experiments show that nutrition, temperature, moisture, and light have a distinct effect upon the growth and reproduction of the organisms studied and that characters which have been used in limiting species in the genera mentioned are affected by environmental conditions.

On the basis of these investigations, the grouping of several of these so-called species is proposed after a discussion is given on the species concept in fungi.

EDUCATIONAL CAREER

B.S., University of Illinois, 1927

M.S., University of Illinois, 1928

Scholar in Horticulture, University of Illinois, 1927-1928

Assistant in Botany, University of Illinois, 1929-1930

Fellow in Botany, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

MARIAN ELIZABETH BAKER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 26, 1932, 9 A. M.
Room 424, Library

COMMITTEE IN CHARGE:

PROFESSOR FREDERICK C. DIETZ, *Chairman*
PROFESSOR HARRY S. V. JONES
PROFESSOR PAUL V. B. JONES
PROFESSOR LAURENCE M. LARSON
PROFESSOR ALBERT H. LYBYER

Outline of Studies

Major Subject: History

Minor Subject: English Literature

Thesis: ENGLISH FACTIONAL POLITICS, 1596-1599

Summary

After the entrance of Robert Cecil into the privy council in 1591 and of the Earl of Essex two years later, factional rivalry centered in the two young leaders. The elements of the old war party, which had been led by Walsingham and Leicester, collected around Essex with his propensity for military courses and sympathy for the anti-League forces in France. The Cecils, distrusting the sincerity of the King of Navarre, were unwilling to give him adequate assistance. Realizing the popularity of Essex and his power over the Queen, the Cecils sought to keep him out of England. The history of the period from 1596 to 1599 is the record of successive attempts to remove Essex from court.

In 1596, the earl was sent as joint commander of an expedition to Cadiz. Dissensions forced his return before the expedition as projected was carried out. In his absence, Robert Cecil had become secretary, and there were other plans to advance Cecilian adherents which Essex's sudden return checked. A new effort to send the earl to Ireland was thwarted by his suspicion of the motives.

In the next year, 1597, Essex was sent as chief commander on another voyage to Spain and the Azores, although Cecil foresaw failure in all of the Queen's objectives. Misfortune and treachery brought Essex back unsuccessful to face an angry Queen and a hostile court.

With the decay of his fortunes, Essex was deserted by Francis Bacon, who, under the pretense of friendship, advised the earl to offer his services in Ireland. The literal minded Essex followed the advice only to find his offer accepted by his enemies. His own inexperience in Irish affairs and the inefficiency and corruption in the departments which provided men and supplies contributed to his failure. The Queen and the privy council criticized him for steps they had once approved or for which his commission gave him authority. A sudden return to England, in defiance of contrary orders in a letter supposedly written by the Queen, led to his imprisonment, but the accusations were too vague for conviction. The necessary charge of treason was supplied by the rebellion of 1601, which is a story in itself.

In the preparation of this study, the available printed sources such as State Papers and contemporary letters and journals have been consulted. In addition, much valuable material was found in the Public Record Office and Lambeth Palace Library in London.

EDUCATIONAL CAREER

A.B., University of Illinois, 1928

A.M., University of Illinois, 1929

Assistant in History, University of Illinois, 1928-1930, 1931-1932

Fellow in History, University of Illinois, 1930-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CHARLES BRUNNER BECKER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

FRIDAY, MAY 20, 1932, 3 P. M.
Room 456, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR ROGER ADAMS, *Chairman*
PROFESSOR VINCENT DUVIGNEAUD
PROFESSOR WILLIAM C. ROSE
PROFESSOR RALPH L. SHRINER
PROFESSOR ELMER H. WILLIAMS

Outline of Studies

Major Subject: Chemistry (Organic)

First Minor Subject: Physiological Chemistry

Second Minor Subject: Physics

Thesis: THE STEREOCHEMICAL PROPERTIES OF 2,2′-DIFLUORO-6,6′-DIMETHOXY-3,3′-DICARBOXYDIPHENYL

Summary

In order to test the accuracy of X-ray data on the interference values of the fluorine and methoxy groups as ortho-substituents in the diphenyl molecule, 2,2′-difluoro-6,6′-dimethoxy-3,3′-dicarboxydiphenyl was prepared by (1) the condensation of 2-fluoro-6-methoxy-1-iodobenzene with copper bronze at 200°; (2) the introduction of two aceto groups into the 3, 3′-positions by means of acetyl chloride and aluminum chloride; and (3) the oxidation of the aceto groups with sodium hypochlorite to carboxyl groups. But before the preparation of this diphenyl derivative which was finally employed, several series of compounds containing fluorine or methoxyl were obtained. The completion of these series (with the synthesis of an ortho-difluoro-dimethoxy diphenyl) could not be attained in spite of numerous modifications because some of the compounds failed to react in standard fashion to give the desired compound next in order.

Although the calculated interference value for two fluorine and two methoxy groups in the ortho positions in diphenyl was + 0.03 Å, there was no experimental evidence to support the prediction that blocking would occur and permit the isolation of two antipodal forms. The monobrucine, dibrucine, cinchonine, morphine, quinine, and strychnine salts were obtained in only one modification; there was no indication of mutarotation at 0°; and decomposition in all cases gave an inactive acid.

EDUCATIONAL CAREER

S.B., University of Chicago, 1928

S.M., University of Chicago, 1929

Assistant in Chemistry, University of Illinois, 1929-1930

Fellow in Chemistry, University of Illinois, 1930-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

DAVID MIERS BEIGHTS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

SATURDAY, MAY 14, 1932, 9 A. M.
Room 420, Commerce Building

COMMITTEE IN CHARGE:

PROFESSOR MAURICE H. ROBINSON, *Chairman*
PROFESSOR HORACE M. GRAY
PROFESSOR ANANIAS C. LITTLETON
PROFESSOR HIRAM T. SCOVILL
PROFESSOR NATHAN A. WESTON
PROFESSOR IVAN WRIGHT

Outline of Studies

Major Subject: Economics (Finance)
First Minor Subject: Economic Theory
Second Minor Subject: Accountancy

Thesis: FINANCING AMERICAN RUBBER MANUFACTURING COMPANIES

Summary

1. The financing of the American Rubber Manufacturing Companies was affected to a marked degree by the following characteristics of the rubber industry:
   a. Dependence upon foreign producers for entire supply of crude rubber
   b. Dependence upon the automotive industry for the major part of the demand for the finished product
   c. Extreme fluctuations in the prices of crude rubber
   d. Technological improvements in the manufacture of rubber products
   e. Concentration of production under control of a few large companies
2. The nine year period of rapid expansion which ended with 1920, was improperly financed.
   a. Inventories were increased beyond all reasonable needs, resulting in severe losses in 1920 and 1921
   b. Short term borrowing was used to an excess, resulting in forced financing, forced liquidation of stocks, and reorganizations
3. During the ten year period ending with 1930, the financial structure was financially and economically unsound.
   a. The amount of bonds used in the financing was excessive
   b. The amount of preferred stocks used was also excessive
   c. The companies operated on a common stock equity which was too small
   d. The common stockholder suffered a loss because of trading on the equity
4. The low rate of earnings during the second period was due primarily to excess production capacity which existed in the industry, resulting in severe competition among the producing companies.
5. There are definite relations existing between the component parts of the financial plan of a business concern—assets, liabilities, and income—and a quantitative analysis, if properly made and used, will show to a fair degree of accuracy what the proper relations should be.
6. The majority of the errors and failures in financing in the rubber manufacturing industry can be attributed to the ignorance and incompetence of those who have decided the major policies without adequate information and understanding of all aspects of business operation and the relation of these operations to economic conditions in general, and the economic conditions of the rubber industry in particular.

EDUCATIONAL CAREER

A.B., University of Colorado, 1925

M.S., University of Illinois, 1927

Assistant in Accountancy, University of Illinois, 1926-1928, and 1930-1931

Associate Professor of Commerce, Marshall College, 1928-1929, and 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ALFRED THEODORE BLOMQUIST

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

SATURDAY, MAY 21, 1932, 9 A. M.
Room 176, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR CARL S. MARVEL, *Chairman*
PROFESSOR THOMAS E. PHIPPS
PROFESSOR WORTH H. RODEBUSH
PROFESSOR RALPH L. SHRINER
DOCTOR LEONARD L. STEIMLEY

Outline of Studies

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Mathematics

Thesis: A STUDY OF CONJUGATED UNSATURATED HYDROCARBONS

Summary

1. Substituted divinyl acetylenes of the type

$$R - CH = \underset{\underset{R'}{|}}{C} - C \equiv C - \underset{\underset{R'}{|}}{C} = CH - R$$

have been prepared.

2. The following reactions of these conjugated unsaturated hydrocarbons have been studied.

1. The addition of oxygen
2. Polymerization
3. The addition of bromine
4. The addition of hydrogen
5. The addition of water
6. The addition of maleic anhydride

3. The addition reactions of substituted divinyl acetylenes are best explained by 1,4-addition.

4. The action of various dehydrating agents on symmetrical unsaturated 1,4-glycols has been investigated.

EDUCATIONAL CAREER

A.B., University of Illinois, 1928

M.S., University of Illinois, 1929

Assistant in Chemistry, University of Illinois, 1930-1931

Fellow in Chemistry, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

DANIEL BORTH, JR.

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, MAY 24, 1932, 3 P. M.
Room 420, Commerce Building

COMMITTEE IN CHARGE:

PROFESSOR HORACE M. GRAY, *Chairman*
PROFESSOR ERNEST L. BOGART
PROFESSOR MERLIN H. HUNTER
PROFESSOR MAURICE H. ROBINSON
PROFESSOR HIRAM T. SCOVILL
PROFESSOR NATHAN A. WESTON
PROFESSOR IVAN WRIGHT

Outline of Studies

Major Subject: Economics

First Minor Subject: Public Utilities

Second Minor Subject: Accountancy

Thesis: CAPITALIZATION OF PUBLIC SERVICE CORPORATIONS

(Its Relation to the Rate Base, the Rate of Return and Service.)

Summary

The period of high prices has been characterized by the inflation of book values of utilities which has been accomplished by direct and indirect methods of write-ups, the latter more frequently, and improper accounting practices by both utility and holding companies. Against such inflated book values, which were booked by circuitous financial methods to make the transactions appear *bona fide* purchases and sales, securities were almost invariably issued presumably to increase the marketability of the shares. The holding companies have purchased operating properties at amounts in excess of their reasonable worth. Public utility companies have proceeded on policies of competitive enterprises in the issuance of securities.

The "fair value" concept is vague and indeterminate and lends itself to manipulation. Authoritative court decisions are cited by commissions to justify the consideration of the outstanding securities in the derivation of "fair value." The rationalization that "fair value" is a physical property valuation has meant that regulation of securities and accounting have been relegated to minor positions. The "fair rate of return" has attained a marked uniformity in regulatory practice. The pliancy and uncertainty of "fair value" have resulted in the issuance of securities against over-valued properties and their subsequent presentation as material data in pleas for increases of "fair value." The interstate aspects of utility capitalization, the inadequacies of statutory provisions, commission personnel and finances and the superficiality of regulatory practices prevent effective regulation of securities. Present regulation has not eliminated the possibilities of overcapitalization nor its effects upon the rates and the service of utilities.

The clarification of the concepts of "fair value" and the "fair rate of return" and the segregation and weighing of factors determining both are desirable. The rate base should be an accounting record regardless of the theory of valuation. The proper theory of capitalization for *public service* corporations is the prudent investment. If the fluctuating valuation be continued, consistency would demand that the common stock be viewed as participation certificates. Such recognition would ease the problems of adjustments to changing price levels and the elimination of overcapitalization. The investment should be segregated and preserved regardless of the theory of valuation. Overcapitalization of the holding companies may be detrimental to the interests of the utilities. Regulation should be strengthened at the source of the income—the utility. Effective state regulation of capitalization demands that all utilities operating intra-state be of domestic incorporation and subject to continuous commission audit.

EDUCATIONAL CAREER

B.S., University of Kansas, 1927

M.S., University of Illinois, 1928

Assistant in Bureau of Business Research, University of Illinois, 1927-1928

Assistant in Accountancy and Economics, University of Illinois, 1928-1931

Fellow in Economics of Public Utilities, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CHARLES ANDREW BROWN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

FRIDAY, MAY 27, 1932, 10 A. M.
Room 120, Old Agriculture

COMMITTEE IN CHARGE:

PROFESSOR HARRISON A. RUEHE, *Chairman*
PROFESSOR WALTER L. GAINES
PROFESSOR LAURENCE J. NORTON
PROFESSOR MARTIN J. PRUCHA
PROFESSOR CHARLES L. STEWART
PROFESSOR NATHAN A. WESTON

Outline of Studies

Major Subject: Dairy Husbandry (Marketing)
First Minor Subject: Economic Theory
Second Minor Subject: Statistics

Thesis: RECENT ADJUSTMENTS TO LOW DAIRY PRICES WITHIN THE DAIRY INDUSTRY

Summary

Two major periods of declining prices have occurred since the World War each requiring significant industrial changes. The dairy industry adjusted itself to the first period (1920-1922) and soon became relatively prosperous. Owing to the longer and more drastic decline which has been in progress since the latter part of 1929, adjustments now need be greater in degree and wider in scope. The many changes that have been made are still inadequate. Farmers, facing reduced income and the need for immediate cash, have employed various means of increasing milk production. Numbers of cows have been increased and heavier feeding has been practiced in most dairy sections. Significant reductions in the number of cows slaughtered have occurred annually. Substantially larger percentages of cows have been milked. Relatively low feed prices have enhanced the rate of feeding. Low farm wages as well as low feed prices have materially reduced milk production costs. Farmers, however, can make further reductions by better herd management.

An abnormally large decrease in the demand for dairy products accompanied this decline. In 1931, retail prices of most of the important dairy products averaged 23 percent below 1929. The reduction, however, did not produce any significant change in the consumption of dairy products as a group. Price reductions in some products especially milk and ice cream have not yet been sufficient to maintain the previous rate of consumption. The high cost of marketing has been largely responsible for insufficient reductions in the prices of these products. Several different factors retard the decline in marketing costs. No significant changes have been made in dairy machinery prices. In certain unionized markets wages are relatively higher than the cost of living. Building costs are still high especially in large cities. In fact reductions in the cost of practically all services and materials used in the marketing of dairy products have not kept pace with declines in prices paid producers. The industry's rate of recovery from this depression depends largely upon the amount of reduction in these costs and the rate of making them. A detailed analysis of all major cost factors generally will show where significant reductions can be made.

EDUCATIONAL CAREER

B.S., Purdue University, 1917

M.S., Purdue University, 1920

Associate in Dairy Economy, University of Illinois, 1925-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HENRY LLOYD BUCKARDT

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, MAY 31, 1932, 9 A. M.
Room 110, Old Agriculture

COMMITTEE IN CHARGE:

PROFESSOR WILLIAM L. BURLISON, *Chairman*
PROFESSOR ERNEST E. DETURK
PROFESSOR GEORGE H. DUNGAN
PROFESSOR CHARLES F. HOTTES
PROFESSOR WALTER S. MONROE
PROFESSOR CLYDE M. WOODWORTH

Outline of Studies

Major Subject: Agronomy

First Minor Subject: Education

Second Minor Subject: Plant Physiology

Thesis: EFFECT OF FALL, WINTER, AND SPRING SEEDING ON YIELD, CERTAIN PLANT CHARACTERS, QUALITY AND GERMINATION OF WHEAT VARIETIES

Summary

The optimum time of seeding spring wheat was found to vary at Urbana with the variety and with the seasonal environmental factors. The results indicate that most spring wheat varieties cannot be sown too early, after the middle of January, provided the soil is in suitable condition for seeding.

Marquis and Illinois No. 1 B varieties produced maximum yields, tallest plants, and best quality grain when seeded in January and February during a comparatively high temperature period. Garnet gave best results when seeded approximately two weeks later than Marquis and Illinois No. 1 B. Turkey Red wheat failed to develop heads when seeded after the critical spring date; it produced only a prostrate vegetative growth and later was entirely killed by the hot dry weather of July and August. Extremely early spring seeding produced fair yields, but only 20 percent as much as late fall and 50 percent as much as winter sown wheat.

Grain from plants grown from seedings made at different dates showed only minor variations in percentage and vigor of germination.

Seed from plants grown from seedings made at different dates in the field when planted in the greenhouse produced significant differences in yield and culm length, but not in spike length. The size of the seed planted in the greenhouse was correlated positively with the length of culm and with the grain yield of the crop produced, but there was no correlation between size of seed and length of head produced.

Plants under field conditions survived low temperatures and produced larger yields when the plumule was one-fourth inch long than when germination was just beginning. Plants not yet emerged from the soil withstood much lower temperatures than seedlings, the plumules of which were above the ground.

This investigation emphasized what is believed to be three essentials for accurately determining the influence of weather upon the wheat plant. First, records must be continued over a period of years. This is evident from the fluctuations in results which occurred from year to year. Second, the data must show the effects of weather on all plant characters. Other investigators have made valuable advances by correlating yield with weather factors. Most of these have considered only grain yield. Fundamental progress, however, must lie in relating the yield attributes, such as tillering, height of plant, and spike length, to the weather factors. Finally, what may be called the indirect effects of weather must be measured. For example, certain crop diseases cause much greater losses in the same area during different seasons largely because of the influences of the climatic environment upon the pathogenic organism.

EDUCATIONAL CAREER

B.S., University of Illinois, 1926

Smith-Hughes Agricultural Instructor, Leland Community High School, Leland, Illinois, 1926-1928

M.S., University of Illinois, 1929

Assistant in Crop Production, University of Illinois, 1929-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JOHN HARVEY BUTCHART

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, MAY 31, 1932, 4 P. M.
Room 254, Mathematics Building

COMMITTEE IN CHARGE:

PROFESSOR HARRY LEVY, *Chairman*
PROFESSOR HENRY R. BRAHANA
PROFESSOR ROBERT D. CARMICHAEL
PROFESSOR ARTHUR B. COBLE
PROFESSOR ARNOLD EMCH
PROFESSOR OLIVE C. HAZLETT
PROFESSOR JAKOB KUNZ

Outline of Studies

Major Subject: Mathematics (Geometry)
First Minor Subject: Analysis
Second Minor Subject: Physics

Thesis: HELICES IN EUCLIDEAN N-SPACE

Summary

For a curve in euclidean three space, if the ratio of the first curvature to the second is constant, the curve is a helix, and conversely. This is merely a special case of a necessary and sufficient condition that a curve in n-space be a helix. The principal problem of this thesis is the construction of the function B_n of the curvatures, which is constant if the curve is a helix. The form of this function is

$$B_n = 1 + \rho_2^2/\rho_1^2 + \rho_3^2 T_4^2 + \rho_4^2 T_5^2 + \cdots + \rho^2_{n-1} T_n^2$$

where T_p involves only $\rho_1, \cdots, \rho_{p-2}$. To prove the curve a helix we need to know that B_n is constant and also that T_n is not zero. We call the curves for which B_n is constant but T_n vanishes pseudo-helices. Among the geometric properties of these curves are the theorems that a curve all of whose curvatures are constant is a helix if it lies in a space of an odd number of dimensions and is a pseudo-helix if it lies in a space of an even number of dimensions, and that the same statement holds if the ratios of the first curvature to the second, third to the fourth, and so on, are constant.

EDUCATIONAL CAREER

B.S., Eureka College, 1928

A.M., University of Illinois, 1929

Scholar in Mathematics, University of Illinois, 1928-1929

Assistant in Mathematics, University of Illinois, 1929-1930, 1931-1932

Fellow in Mathematics, University of Illinois, 1930-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

SISTER MARY CAMILLUS BYRNE, R.S.M.

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, DECEMBER 20, 1932, 2:30 P.M.
Room 217, Lincoln Hall

COMMITTEE IN CHARGE:

PROFESSOR ALBERT W. ARON, *Chairman*
PROFESSOR NEIL C. BROOKS
PROFESSOR EDWARD H. CAMERON
PROFESSOR GLENN R. MORROW
PROFESSOR CHARLES A. WILLIAMS

Outline of Studies

Major Subject: German

First Minor Subject: German Philology

Second Minor Subject: Education

Thesis: CHAPTER DIVISION IN THE EARLY GERMAN NOVEL

Summary

For the purpose of launching this investigation the word *chapter* is tentatively defined as one of the consecutively enumerated divisions of a prose text. These units of prose, familiar to readers of fiction, did not exist in the early novels. When, why, and by whom, then, was the practice of making chapters introduced into the German novel?

Chapter I is devoted to the genesis of the *chapter* in prose. Chapter II is a study of the partitioning of the prose in Elisabeth von Nassau-Saarbrücken's work. *Hug Schapler* receives most attention because material for a study of its chapter division was more easily accessible than for either *Herpin* or *Loher und Maller*. Chapter III is devoted to the study of the partitioning of *Pontus und Sidonia* by Eleonora von Schottland. Chapter IV deals with Thüring von Ringoltingen's *Melusine*.

Modern commentators who have dealt with the early German novels discussed (Nowack, Fröhlicher, Müller, Urtel, Wüst, Liepe, etc.) have tacitly defined the *chapter*. It is, at times, a portion of the text which is introduced by a large initial letter or space left for the same. Again it is that portion of the text which is preceded by a heading, and this even when the heading is clearly only a picture title.

There would be much less confusion in discussing the early German novel were commentators to call the partitions of the prose in MS. and incunabula "capital-paragraphs."

In the early sixteenth century the printers began to retain the picture titles for headings of capital-paragraphs even when some of the old cuts to which they belonged were too worn for further use. With some feeling for proportion they then made and distributed new titles at rather regular intervals through the long prose passages. These "Überschriften" are no longer picture titles, neither are they "arguments" of the passage which follows. They are "pictures in words" of some particular incident in the prose partition to which they belong and they were made, not by the author, but by the printer.

Melusine, *Pontus und Sidonia*, and *Herpin* were over a hundred years old before they were chaptered for Feyerabendt's *Buch der Liebe*. It is then the printer who is responsible for the chapter technique in these early German novels.

EDUCATIONAL CAREER

A.B., Catholic University of America, 1912

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CLYDE TRAIN CALDWELL

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, MAY 17, 1932, 3 P. M.
Room 456, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR WILLIAM C. ROSE, *Chairman*
PROFESSOR VINCENT DU VIGNEAUD
PROFESSOR REYNOLD C. FUSON
PROFESSOR RALPH L. SHRINER
PROFESSOR FRED W. TANNER

Outline of Studies

Major Subject: Chemistry (Physiological)
First Minor Subject: Organic Chemistry
Second Minor Subject: Bacteriology

Thesis: GROWTH EXPERIMENTS WITH MIXTURES OF AMINO ACIDS

Summary

Hydrolyzed casein has been fractionated into several groups of amino acids by a carbamate procedure, and a copper salts method. The fractions obtained have been tested for their supplementing effect when added to diets containing a synthetic amino acid mixture.

The results of the experiments indicate that the monamino acid groups prepared by each method contain an unknown protein component which is essential for life. The presence of the active material has been demonstrated by means of its remarkable stimulating effect upon the growth of rats.

Through the application of the procedures employed, and others which have been attempted, additional characteristics of the unknown substance have been determined. Some of its properties are listed below:

The unknown protein component is very soluble in water, but insoluble in absolute ethyl alcohol and in diethyl ether.

It is somewhat soluble in 94 per cent methyl alcohol, and in ethyl alcohol containing a little water.

It is insoluble in anhydrous butyl alcohol, but is slowly soluble in this reagent when saturated with water.

It is not precipitated by barium hydroxide and ethyl alcohol, nor by phosphotungstic acid in 5 per cent sulfuric acid solution.

It appears not to yield an insoluble picrate, nor an insoluble picrolonate.

Its copper salt is quite soluble in water, and moderately soluble in absolute methyl alcohol.

It yields a carbamino derivative which is soluble in ice water.

Its zinc salt is insoluble in absolute ethyl alcohol.

EDUCATIONAL CAREER

B.S., Earlham College, 1922

M.S., University of Illinois, 1923

Chemist, Standard Oil Company of Indiana, Whiting, Indiana, 1923-1924

Instructor, Assistant Professor, and Acting Head of Department of Chemistry, Earlham College, 1924-1930

Assistant in Chemistry, University of Illinois, 1922-1923, and in 1930-1931

Special Research Assistant in Chemistry, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

EDWARD VICTOR CARDINAL

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 26, 1932, 2 P. M.
Room 424, Library

COMMITTEE IN CHARGE:

PROFESSOR LAURENCE M. LARSON, *Chairman*
PROFESSOR FREDERICK C. DIETZ
PROFESSOR JAMES W. GARNER
PROFESSOR ALBERT H. LYBYER
PROFESSOR JOSEPH W. SWAIN

Outline of Studies

Major Subject: History (Medieval)

Minor Subject: International Law

Thesis: CARDINAL LORENZO CAMPEGGIO (1474-1539)

Summary

Lorenzo Campeggio was born in Milan in 1474. He was educated to be a lawyer, as his father and grandfather had been. All three of them taught law at the University of Bologna. He married Francesca Guastavillani in 1499 and had three sons by her. Alessandro (1504-1554), his eldest son, succeeded him as Cardinal-Archbishop of Bologna. Rodolpho (1507-1545) followed the military profession. The third son, Giovanni Battista (1508-1583), became bishop of Majorca. Lorenzo was also the father of two illegitimate daughters. After the death of his wife in 1509, Lorenzo embraced the ecclesiastical profession.

Pope Julius II, because of the help which the Campeggi family had given him in seizing Bologna, was very partial to the new cleric. He called him to Rome and after a stay of six months in the Eternal City Lorenzo was sent on his first mission to Maximilian. The purpose of the mission was to dissuade Maximilian from his interest in the schismatic Council of Pisa and to enlist him in favor of the Pope's Lateran Council (1512). In the following year, he was appointed Ambassador to the Court of the Duke of Milan and succeeded here in winning back for the Church the cities of Parma and Piacenza. In 1514 he was sent back to the Emperor-elect Maximilian to establish peace among the rulers of Bohemia and Hungary. He was made a Cardinal in 1517 by Leo X, and immediately afterward was appointed to go to England to enlist the help of Henry VIII in a Crusade against the Turks. In 1524 Pope Clement VII appointed him legate to the Diet of Nurnberg. After his unsuccessful mission at the diet, he was sent to England to preside at the Divorce Trial of Henry VIII (1528). After his futile efforts in England, he returned to Germany to assist at the Diet of Augsburg (1530). Pope Paul III appointed him legate to the Council of Trent which was to meet at Mantua in 1537. He died in Rome two years later.

EDUCATIONAL CAREER

A.B., St. Viator College, 1920

A.M., Catholic University of America, 1924

Vatican Archives, Rome, 1930-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CECIL CLAYTON CARPENTER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

FRIDAY, MAY 27, 1932, 3 P. M.
Room 420, Commerce Building

COMMITTEE IN CHARGE:

PROFESSOR NATHAN A. WESTON, *Chairman*
PROFESSOR EDWARD BERMAN
PROFESSOR ERNEST L. BOGART
PROFESSOR EDWARD J. FILBEY
PROFESSOR MERLIN H. HUNTER
PROFESSOR HIRAM T. SCOVILL
PROFESSOR MAX J. WASSERMAN

Outline of Studies

Major Subject: Economics

Minor Subject: Accountancy

Thesis: MONETARY THEORY IN ENGLAND DURING THE BANK RESTRICTION PERIOD 1797-1821

Summary

Following the suspension of specie payments at the Bank of England in 1797, the difficulties which usually accompany irredeemable paper money—namely, fluctuating exchange rates, rising commodity prices, and high bullion prices—led to many improvements in the prevailing doctrines concerning money.

Between the years 1801 and 1807, tracts on money written by Walter Boyd, Henry Thornton, Lord King, and John Wheatley pointed to the inadequacy of the doctrines of David Hume and Adam Smith for explaining the value of inconvertible paper money. This group of pre-Ricardian writers offered original explanations of the differences between redeemable and irredeemable paper currency, holding that the latter would depreciate if issued to excess, while an over-supply of the former would be prevented by flows of gold abroad. They measured such depreciation by the extent of the unfavorable exchanges, the high price of bullion, and the rise of commodity prices. As a remedy for depreciation of paper currency, it was recommended that the chief note-issuing bank—the Bank of England– should reduce its issues until the foreign exchanges and the price of gold bullion fell to par. Excellent statements of the quantity theory of the value of money, the purchasing-power-parity theory of exchange rates, and the theory of international prices were given by these early nineteenth century writers.

The Report of the Bullion Committee in 1810 was followed by a spirited public controversy over the theory of the value of paper money. Bank of England officials and pamphlet writers denied that the unfavorable foreign exchanges and high bullion prices were caused by excess issues of Bank of England notes. The Bullion Committee and a small group of writers—the most important being David Ricardo—defended the analysis of paper money previously given by Boyd and his followers. They restated the purchasing-power-parity doctrine, the international price theory, and the quantity theory, and applied them directly to the existing currency situation.

In 1811, the House of Commons passed resolutions rejecting the Bullion Report but in 1819 both houses of Parliament favored a return to specie payments in order to avoid the violent fluctuations in the value of the circulating medium. The theory of the monometallic standard was outlined in the writings of David Ricardo, and legislation in accord with his theory was adopted in Liverpool's Coinage Law of 1816 and Peel's Resumption Act of 1819.

EDUCATIONAL CAREER

B.S., University of Kentucky, 1926

M.S., University of Illinois, 1927

Assistant in Accountancy, University of Illinois, 1926-1929

Fellow in Economics, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

LINCOLN HSIU CHA

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

FRIDAY, DECEMBER 16, 1932, 3:30 P.M.
Room 301, Lincoln Hall

COMMITTEE IN CHARGE:

PROFESSOR JAMES W. GARNER, *Chairman*
PROFESSOR CLARENCE A. BERDAHL
PROFESSOR JOHN A. FAIRLIE
PROFESSOR FREDERIC E. LEE
PROFESSOR JOHN M. MATHEWS
PROFESSOR PHINEAS L. WINDSOR

Outline of Studies

Major Subject: Political Science

First Minor Subject: Economics

Second Minor Subject: Library Science

Summary

The German Air Traffic Law of 1922 provides that the aircraft operator (*Halter*) incurs liability regardless of fault and that his liability is limited to the payment of certain sums of money. There are circumstances, however, under which the operator incurs liability of a greater magnitude. In addition to the aviation statute, other laws of the *Reich* may be applied when necessary. Unlike the situation in France where the injured passenger or his legal representative may render the air carrier liable by proving a tort on the part of the latter, the injured party in Germany must prove the operator's wilful fault in order to obtain compensation. The validity of the stipulation for the limitation of or exemption from liability in passenger contracts has also had the effect of doing away with the stringent liability contemplated in the aviation statute.

In France, the carrier is under an obligation to carry the passenger safe and sound to his destination. The Rabier law of 1905 which deals with land carriage forbids the use of the stipulation in passenger contracts limiting the carrier's liability or exempting him from liability. The French Air Navigation Law of 1924, however, provides that the air carrier may, by an express clause, exonerate himself from liability to passengers which he incurs by reason of risks of the air and faults of navigation. This clause exonerates the air carrier from liability only when the aircraft was in a good condition of navigability at the time of departure and if the crew was provided with licenses and regulatory certificates.

The Italian Air Navigation law of 1926 adopts the maritime law principle of abandonment by providing that the air carrier may abandon the damaged aircraft together with its freight to the creditors and be relieved of liability. The effect of such abandonment makes it impossible for the injured passenger or his legal representative to obtain compensation, because usually after an accident, the value of an aircraft is greatly reduced or destroyed.

American courts have applied the law of torts with respect to land carriage in cases involving the air carrier's liability to passengers for death and personal injuries. In England, there is no case law or legislation dealing with this matter. American state statutory law also favors the law of torts concerning land carriage. In the United States, there have been attempts to introduce principles of maritime law into a federal statute. None of these attempts, however, has been successful.

Under the Warsaw Convention of 1929, the air carrier's liability is limited to the payment of certain sums of money. These sums may be increased and not decreased by contract between the carrier and the passenger. The carrier is relieved of liability if he proves that he has used "necessary measures" to prevent the injury. The use of the stipulation, in passenger contracts, limiting the air carrier's liability or exempting him from liability is forbidden.

EDUCATIONAL CAREER

A.B., Boone University, China, 1922

B.L.S., University of Illinois, 1929

A.M., University of Illinois, 1930

Head of Chinese Cataloging Department, Tsing Hua University, China, 1922-1927

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CLARENCE ARTHUR CLAUSEN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

MONDAY, MAY 30, 1932, 9 A. M.
Room 424, Library

COMMITTEE IN CHARGE:

PROFESSOR LAURENCE M. LARSON, *Chairman*
PROFESSOR FREDERICK C. DIETZ
PROFESSOR HARRY S. V. JONES
PROFESSOR PAUL V. B. JONES
PROFESSOR ALBERT H. LYBYER

Outline of Studies

Major Subject: History (Modern European)
First Minor Subject: Medieval History
Second Minor Subject: Scandinavian

Thesis: DR. FRIDTJOF NANSEN'S WORK AS HIGH COMMISSIONER OF THE LEAGUE OF NATIONS

Summary

Dr. Nansen was in charge of four great humanitarian tasks as High Commissioner of the League of Nations.

Between May, 1920, and June, 1922, he supervised the repatriation of 427,886 prisoners who had lingered in Russia and Central Europe since the first years of the Great War. To accomplish this task he secured the co-operation of the governments concerned and various humanitarian organizations, while the necessary funds were obtained from the International Committee for Relief Credits and the American Joint Repatriation Committee.

In June, 1921, he assumed work in behalf of Russian refugees who were scattered throughout Europe as a consequence of the Soviet revolution and various counter-revolutions. Fifty-one governments agreed to issue "Nansen Passports" to the exiles, while in cooperation with the International Labour Office the High Commissariat succeeded in obtaining positions for thousands of the refugees, especially in France and the Balkans.

Following the Hellenic disasters in Asia Minor in August, 1922, almost a million and a half refugees swarmed into Greece. In this emergency Dr. Nansen was able to procure much food, clothing, and medical supplies for the unfortunate people. Due largely to his efforts also the League took steps to raise loans for Greece, while a commission was appointed under whose supervision vast settlement projects were carried out in various parts of the country.

Dr. Nansen's last commission under the auspices of the League was undertaken in behalf of the Armenian refugees. In 1924 the "Nansen Passports" were made available also for these exiles, while many of them were given employment in different European countries. In 1925 Dr. Nansen headed a commission which investigated the possibilities of founding refugee settlements in the Republic of Erivan, and later projects were undertaken in Syria in accordance with which 12,000 Armenians had been provided with homes when Dr. Nansen died in 1930.

EDUCATIONAL CAREER

B.A., St. Olaf College, 1923
Student at University of Oslo, Norway, 1923-1924
Assistant Professor, St. Olaf College, 1924-1928
M.A., University of Illinois, 1929
Assistant in History, University of Illinois, 1929-1931
Associate Professor, St. Olaf College, 1931-

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

RICHARD KENNETH COMPTON

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 19, 1932, 3 P. M.
Room 108, Administration Building

COMMITTEE IN CHARGE:

PROFESSOR PAUL T. YOUNG, *Chairman*
PROFESSOR ELMER A. CULLER
PROFESSOR DONALD R. TAFT
PROFESSOR W. RUSSELL TYLOR
PROFESSOR HERBERT WOODROW

Outline of Studies

Major Subject: Psychology

Minor Subject: Sociology

Thesis: AN EXPERIMENTAL AND ANALYTICAL STUDY OF ORGANIC SET

Summary

Under a general instruction, sensory presentations of six successive stimulations predispose or set the subject to react in a definite manner. This predisposition or readiness to act is a temporary set.

The present investigation has two aims: (1) an experimental aim —to determine the extent to which organic set is conditioned upon the sensory mode of presentation, and (2) an analytical aim—to show the relation of organic set to other psychological concepts.

Seven modes of presentation are used: (1) visual, (2) auditory, (3) tactual, (4) visual-auditory, (5) visual-tactual, (6) auditory-tactual, and (7) visual-auditory-tactual.

The subject's task is to reproduce immediately a space-time stimulus-pattern by pressing response-keys suitably provided for that purpose.

In summary, the results obtained are as follows:

(1) The differences in set as dependent upon mode of presentation are relatively slight.

(2) A reliable difference was obtained between the visual and the tactual, and between the auditory and the tactual modes of presentation. The tactual is slightly more difficult than the visual and the auditory.

(3) No differences were obtained between the mixed presentation-types and the pure presentation-types that could not be attributed to the presence of tactual stimulation.

(4) A correlational study indicates that the same general activity is being tested with each of the presentation-types.

(5) The results indicate the existence of a mechanism for the temporary organizing of sensory impressions into a pattern which is capable of determining behavior; and the analysis shows that this organizing mechanism is the same as that involved in the performances of memory span, range of attention, delayed reaction and the formation of configurations.

EDUCATIONAL CAREER

A.B., Kalamazoo College, 1926

A.M., University of Michigan, 1929

Assistant in Psychology, University of Illinois, 1929-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

KENNETH EDWIN CORRIGAN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, MAY 24, 1932, 3 P. M.
Room 456, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR GEORGE L. CLARK, *Chairman*
DOCTOR JOHN C. BAILAR
PROFESSOR DUANE T. ENGLIS
PROFESSOR CHARLES T. KNIPP
PROFESSOR CARL S. MARVEL

Outline of Studies

Major Subject: Chemistry (Analytical)
First Minor Subject: Organic Chemistry
Second Minor Subject: Physics

Thesis: I. DIFFRACTION STUDIES WITH X-RAYS OF LONG WAVE LENGTH.

II. NEW CONSTRUCTION FEATURES OF X-RAY TUBES.

III. THE APPLICATION OF X-RAYS OF HIGH INTENSITY TO THE STUDY OF UNSTABLE AND CHANGING STRUCTURES.

Summary

I. The investigation of rubber and cellulose previously published has been repeated and the results checked. A new method was employed. An investigation of crystalline insulin has been carried out and three spacings of the unit cell measured. These spacings are found to be approximately 130, 100, and 80 Angstrom Units, respectively.

With the aid of microscopic data the crystal form was found to be monoclinic with one angle only slightly less than 90°, so that the individual crystals assume a pseudo hexagonal form.

Assuming the accepted approximate molecular weight of 35,000 the number of molecules per unit cell was found to be 26.

II. The construction of high intensity tubes and tubes for the use of long wave lengths has been investigated and several satisfactory designs worked out.

III. A method has been worked out for the study of the changes taking place in a crystal as it is heated. The high intensity X-ray tube employed will take a satisfactory Laue diagram in a very short time, (0.05 second) while the crystal is at any desired temperature. A small furnace and two types of cameras have been designed.

EDUCATIONAL CAREER

B.S., Knox College, 1928

M.S., University of Illinois, 1930

Assistant in Chemistry, University of Illinois, 1928-1931

Special Research Assistant in Chemistry, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JOHN ARCHER CULBERTSON

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 19, 1932, 3 P. M.
Room 134, Natural History Building

COMMITTEE IN CHARGE:

PROFESSOR THOMAS E. SAVAGE, *Chairman*
PROFESSOR WILLIAM S. BAYLEY
PROFESSOR FRANK W. DEWOLF
PROFESSOR WALDORF V. HOWARD
PROFESSOR ARLE H. SUTTON
PROFESSOR HARLEY J. VAN CLEAVE

Outline of Studies

Major Subject: Geology

Minor Subject: Zoology

Thesis: THE PALEONTOLOGY AND STRATIGRAPHY OF THE PENNSYLVANIAN STRATA BETWEEN CASEYVILLE, KENTUCKY AND VINCENNES, INDIANA

Summary

The purpose of this investigation is to add to the knowledge of the Pennsylvanian strata, and especially of some of the Pennsylvanian faunas of a portion of the Eastern Interior coal basin, about which there has heretofore been comparatively little known. As complete a section as it was possible to obtain is described. The study covered an area extending from the vicinity of Caseyville, Kentucky, where the lowest strata of the system are exposed northward along the Ohio and Wabash rivers to the vicinity of Vincennes, Indiana, and includes parts of the states of Kentucky, Indiana and Illinois. The section includes the strata from the base of the Pottsville to above the middle of the McLeansboro formation and totals more than 2000 feet in thickness.

The megafaunas and microfaunas of the Curlew limestone of Kentucky, of the black shale overlying Kentucky number 9 and Indiana number 5 coals, of the Arthur limestone and the calcareous shale overlying it, of the Somerville limestone of Indiana, of the St. Wendells limestone of Indiana, of the Grayville limestone of Illinois and Indiana, of the Lawrenceville shale of Illinois and Indiana, of the New Haven limestone of Illinois (Grundy knob limestone of Kentucky) and of the Little Chain limestone of Illinois are figured and described as individual faunas for the first time. Correlations of the strata are made with strata in other areas whenever the evidence seems sufficiently strong to warrant them.

These faunas comprise 155 species, distributed among 91 genera and 58 families. Of these species the following new forms are described: Bryozoa: Polypora whitei var. intermedia: Brachiopoda, Chonetes insinuatus, Productus savagei, Spirifer boonensis var. transversalis, Composita argentea var. compressa; Pelecypoda: Aviculopecten suttoni, Deltopecten triserialis: Ostracoda: Bairdia tumida, Healdia geisi, Healdia tenuispinosa, Healdia wagneri, Cypridellina nodosa, and Polycope ? subglobosa.

Polycope ? and Cypridellina are genera which are here reported from the Pennsylvanian strata of North America for the first time.

The Foraminifera, except Fusulinella girtyi, and the Ostracoda are described from this area for the first time, and 38 species of the remaining groups are likewise reported from this part of the coal basin for the first time.

EDUCATIONAL CAREER

A.B., Hanover College, 1921

M.S., University of Chicago, 1924

Assistant in Geology, University of Illinois, 1929-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WADE DEWOOD DAVID

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 26, 1932, 4 P. M.
Room 424, Library

COMMITTEE IN CHARGE:

PROFESSOR ALBERT H. LYBYER, *Chairman*
PROFESSOR FREDERICK C. DIETZ
PROFESSOR CHARLES S. HYNEMAN
PROFESSOR LAURENCE M. LARSON
PROFESSOR JOHN M. MATHEWS
PROFESSOR FREDERICK S. RODKEY
PROFESSOR JOSEPH W. SWAIN

Outline of Studies

Major Subject: History (European)
First Minor Subject: History of the Near East
Second Minor Subject: Political Science

Thesis: TURKEY AND THE POWERS, 1907-1909

Summary

On the eve of the Young Turkish Revolution of 1908, the Ottoman Empire was on the verge of collapse and Europe on the brink of a conflict over the Eastern Question. European economics, cultural, and political penetration had sapped the strength of the Empire and converted it into a field of exploitation and an object of political aspirations, while the rising tide of nationalism within it was threatening to break it up into fragments. The Sultan Abdul Hamid had also become a virtual vassal of the Powers, the prisoner of his own *camarilla,* and the target of Ottoman revolutionaries. The Macedonian *imbroglio* and the "battle of the railways" in the spring of 1908 agitated the Powers violently, occasioned the downfall of the Concert, and caused ententes and alliances to be undergirded in preparation for the anticipated conflict.

The evident prostration of the Sultan before the Powers and his impotence in the face of the internal forces of disruption, spurred the nationalistically minded Young Turks to the opportune uprising of July, 1908. The revolution rescued the Sultan and his Empire from an impending disaster, and immediately clarified the stifling atmosphere that had hung over Europe by effecting a momentary *détente* among the Powers. However, international complications and cross-currents of European diplomacy soon arose again to harass the New Régime in Turkey and to render its success dubious from the outset.

EDUCATIONAL CAREER

A.B., University of Minnesota, 1920

A.M., University of Minnesota, 1925

Professor of History, Minneapolis Bible College, 1924-1929

Graduate Student, University of Chicago, 1929-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

MAX DISSETTE ENGELHART

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, January 19, 1932, 3 p.m.
Room 104 Administration Building

Committee in Charge:

Professor Walter S. Monroe, Chairman
Dean Thomas E. Benner
Professor Edward H. Cameron
Professor B. Smith Hopkins
Professor Charles W. Odell
Professor Robert F. Seybolt

Outline of Studies

Major Subject: Education

First Minor Subject: Educational Research

Second Minor Subject: Inorganic Chemistry

Thesis: THE PROBLEMS AND TECHNIQUES OF EDUCATIONAL RESEARCH

Summary

It is the problem of this thesis to investigate the possibilities and limitations of the existing techniques of educational research as means of solving problems being proposed to research workers for solution. This problem is made more explicit in the following questions: 1. What types of problems have been suggested in recent years for solution by research workers in education? 2. How adequate are contemporary educational research techniques for solving the types of problems suggested?

The sources of data for the first question were the 1925-30 volumes of the seven leading educational research journals: Journal of Educational Research, Journal of Educational Psychology, Educational Administration and Supervision, School Review, Elementary School Journal, School and Society, and Teachers College Record. An additional important source was a list of problems given in the Phi Delta Kappan for October and December, 1926. Analysis of these sources resulted in a list of 2392 proposed problems. Synthesis and elimination of duplicates resulted in 349 items classified and presented under the following headings: 1. The Past in Education (10); Summarization (2); Determination and Appraisal of Present Practices and Conditions (77); Growth or Development of Children or Their Traits (11); Measurement and Research Techniques (41); Concomitant Variation and Prediction (22); Functional Variation or Cause and Effect (106); Determination of Values or What Should Be (80).

The sources of data with respect to contemporary educational research techniques were numerous books, monographs, and articles dealing with educational research techniques, statistical methods, and other related matters. When these techniques were considered with respect to the proposed problems numerous limitations were apparent. In general, present techniques are most adequate for solving the proposed problems relative to the past in education, to the determination of present practices and conditions, and to the summarization of educational research. Present techniques are least adequate in dealing with problems of measurement, growth and development, concomitant variation, and functional variation. These types of problems are mentioned in what appears to be the order of decreasing adequacy of techniques. For problems of values, or what should be, objective techniques are inadequate.

EDUCATIONAL CAREER

B.S., University of Illinois, 1923

M.S., University of Illinois, 1926

Assistant in Bureau of Educational Research, University of Illinois, 1927-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CHARLES HAROLD FISHER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

MONDAY, MAY 23, 1932, 9 A. M.
Room 176, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR REYNOLD C. FUSON, *Chairman*
PROFESSOR DONALD B. KEYES
PROFESSOR CHARLES T. KNIPP
PROFESSOR WORTH H. RHODEBUSH
PROFESSOR RALPH L. SHRINER

Outline of Studies

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: HINDERED ALPHA-HALO KETONES

Summary

The halogenation phase of the Haloform reaction, previously studied in methyl and alpha-monohalomethyl ketones, has been extended to include alpha-dihalomethyl, ethyl, alpha-monohaloethyl and isopropyl ketones.

It has been shown that nitro groups in the meta positions of hindered trihaloacetophenones affect the behavior of such ketones toward alkali. Unlike other trihalomethyl ketones, a hindered tribromoacetophenone with nitro groups in the two meta positions undergoes dehalogenation and not cleavage with alkali.

Grignard reagents have been shown to dehalogenate alpha-halo ketones. In the case of alpha-polyhalo ketones the dehalogenation proceeds stepwise. It was found that the mechanism of this reaction involves an interchange of radicals, the alpha-halo ketone being converted into the magnesium enolate, and the hydrocarbon residue of the Grignard reagent into its halogen derivative. The reactions of various reagents with the magnesium enolate were studied.

EDUCATIONAL CAREER

B.S., Roanoke College, 1928

M.S., University of Illinois, 1929

Assistant in Chemistry, University of Illinois, 1929-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HAROLD Q FULLER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 26, 1932, 2 P. M.
Room 202, Physics Laboratory

COMMITTEE IN CHARGE:

PROFESSOR FRANCIS W. LOOMIS, *Chairman*
PROFESSOR ROBERT D. CARMICHAEL
PROFESSOR CHARLES T. KNIPP
PROFESSOR ROBERT F. PATON
PROFESSOR ELMER H. WILLIAMS

Outline of Studies

Major Subject: Physics

Minor Subject: Mathematics

Thesis: THE EFFECT OF OXYGEN ON THE FLUORESCENCE AND ABSORPTION SPECTRA OF IODINE

Summary

Many of the iodine absorption bands are enhanced by the presence of oxygen. The enhancement is appreciable only for the bands with $v' > 12$ in each of the progressions $v'' = 0,1,2$. The proposed explanation is: the oxygen molecules, upon collision with the iodine molecules, relax certain selection principles and allow the excited iodine molecules with $v' > 12$ to predissociate. This shortens the lives of such molecular states and correspondingly broadens the absorption lines leading to them. This phenomenon affords an explanation of the effect of oxygen upon the iodine fluorescence series.

EDUCATIONAL CAREER

A.B., Wabash College, 1928

A.M., University of Illinois, 1930

Assistant in Physics, University of Illinois, 1928-1931

Fellow in Physics, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WENDELL HINKLE FURRY

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

FRIDAY, MAY 27, 1932, 4 P. M.
Room 202, Physics Laboratory

COMMITTEE IN CHARGE:

PROFESSOR JAMES H. BARTLETT, *Chairman*
PROFESSOR ROBERT D. CARMICHAEL
PROFESSOR CHARLES T. KNIPP
PROFESSOR JAKOB KUNZ
PROFESSOR FRANCIS W. LOOMIS

Outline of Studies

Major Subject: Physics

Minor Subject: Mathematics

Thesis: MOLECULAR ENERGIES: THE LITHIUM MOLECULE

Summary

Methods of calculating molecular energies are considered in connection with experimentally known electronic states of Li_2. The Heitler-London method gives quantitative agreement with experiment for the ground state, $^1\Sigma S^N$. In the first group of excited states one obtains fair agreement for the $^1\Sigma A^N$ state. For the $^1\pi S^N$ state, however, an accurate Heitler-London calculation indicates repulsive character, whereas experiment shows that it is attractive. The Heitler-London method is definitely at fault. A method based on the work of Hylleraas is outlined. This should give more correct results, but it is not practicable to carry it to completion. A combination method is applied, but gives contradiction with experiment. The Heitler-London method remains the only one so far found applicable to molecules other than H_2. It has not been shown to be unreliable when all atomic wave functions concerned have $m_l = 0$; it is perhaps especially trustworthy if they are all s functions. It is certainly not reliable in general. The situation calls for further study of methods of the Hylleraas type.

EDUCATIONAL CAREER

A.B., DePauw University, 1928

A.M., University of Illinois, 1930

Assistant in Physics, University of Illinois, 1928-1931

Fellow in Physics, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WILLARD MARION GERSBACHER

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

SATURDAY, MAY 28, 1932, 10 A. M.
Room 108, Administration Building

COMMITTEE IN CHARGE:

PROFESSOR VICTOR E. SHELFORD, *Chairman*
PROFESSOR LEVERETT A. ADAMS
PROFESSOR ARTHUR G. VESTAL
PROFESSOR HARLEY J. VAN CLEAVE
PROFESSOR HENRY B. WARD
PROFESSOR CHARLES ZELENY

Outline of Studies

Major Subject: Zoology (Ecology)
Minor Subject: Plant Ecology

Thesis: THE DEVELOPMENT OF STREAM BOTTOM COMMUNITIES IN CENTRAL ILLINOIS

Summary

1. Two seres are represented in the study of a longitudinal section of a stream in Central Illinois, (1) a sere from sand, and (2) a sere from mud. The sere from sand converges with the sere from mud and continues as a mud sere.

2. The communities of these seres are of the rank of socies, namely: Chironomus-Lampsilis sand bottom socies, (2) Chironomus-Limnodrilus mud bottom socies, and (3) Vivipara-Pleurocera quasi-climax community.

3. The following facies are exhibited by the Chironomus-Lampsilis sand bottom socies: (1) Chironomus sp. (flavicingula?), and (2) Musculium-Lampsilis. Chironomus plumosus-C. sp. (fulviventris?), and Hexagenia-Limnodrilus are facies of the mud bottom socies.

4. The sere from sand converges with the sere from mud at the Hexagenia-Limnodrilus facies of the mud bottom sere. Vivipara-Pleurocera community must be considered quasi-climax for both seres.

5. The artificial lakes of Central Illinois provide quasi-experimental conditions for the study of the development of stream bottom communities. A study of the bottom of these bodies of water reveals that succession is the phenomenon exhibited by the development of the quasi-experimental areas. The whole sere studied must be regarded as one socies with three distinct facies: (1) Chironomus plumosus, (2) Hexagenia-Procladius sp., and (3) Ceratopogonidae-Limnodrilus sp. The quasi-climax for this sere is probably the Vivipara-Pleurocera community of the Illinois River.

6. The development of the quasi-experimental areas is characterized by the relatively great abundance of individuals of certain species in the early stages of the succession. Other species which are at first relatively scarce later reach maximal development and become the most conspicuous animals of the community.

7. All the animals of the stream bottom should be considered as influents since fish are to be regarded as the true dominants of the community.

EDUCATIONAL CAREER

Ed.B., Southern Illinois State Normal University, 1926

A.M., University of Illinois, 1928

Assistant in Zoology, University of Illinois, 1927-1929

Puget Sound Biological Station, Friday Harbor, Washington, Summer of 1928

Instructor in Botany and Zoology, Southern Illinois State Normal University, 1929-1930, Summers of 1929, 1930

PUBLICATIONS

Experiments with Animals in Tide Pools. Pub. Puget Sound Biol. Sta. 7: 209-215 (with M. Denison).

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

SISTER ROSE MARIE GRADY, O.P.

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

SATURDAY, DECEMBER 17, 1932, 9 A.M.
Room 108, Administration Building

COMMITTEE IN CHARGE:

PROFESSOR WALTER J. GRAHAM, *Chairman*
PROFESSOR ERNEST BERNBAUM
PROFESSOR FREDERICK C. DIETZ
PROFESSOR GEORGE T. FLOM
PROFESSOR HARRY S. V. JONES
PROFESSOR JOHN J. PARRY

Outline of Studies

Major Subject: English

First Minor Subject: English Philology

Second Minor Subject: English History

Thesis: THE SOURCES OF SCOTT'S EIGHT LONG POEMS

Summary

The manifold sources of Scott's poetic romances are to be sought among histories, chronicles, memoirs, travel literature, drama, poetry, essays, and novels known to Scott. Nor did Scott limit the pursuit of his antiquarian interests to writings by Englishmen; he read (usually in English and Latin) and derived significant material from Scandinavian, Icelandic, Anglo-Saxon, German, and Spanish literature. It has long been generally known that Scott read voraciously; but the depth and variety of the background which he brought to the composition of his eight long poems have been suspected by but few. Scott's poems are not an original growth, "a new and vital rendering straight from life."[1] It is precisely such a claim as this that my investigation will refute. Even more significant is the evidence indicating the conscious or unconscious influences of Scott's reviewing and editorial activities. The present study is the first to demonstrate that these writings most certainly supplied a wide variety of details to use for imagery, incident and character. Determination of the sources of Scott's poetry, accordingly, gives additional confidence in judgments of his literary methods, and proves the important proposition: that Scott, who by nature possessed a persistent intellectual curiosity regarding the historic past, was greatly influenced by what he was reading, writing, or editing—and especially by what he was reviewing for the *Edinburgh* and *Quarterly*—at the time of composing his eight long poems.

[1]George Woodberry, *Great Writers*, New York, 1901, p. 66.

EDUCATIONAL CAREER

A.B., Catholic University of America, 1920
A.M., University of Illinois, 1923

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

DOROTHEA HAAS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, MAY 24, 1932, 9 A. M.
Room 176, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR WORTH H. RODEBUSH, *Chairman*
PROFESSOR REYNOLD C. FUSON
PROFESSOR B. SMITH HOPKINS
PROFESSOR CHARLES T. KNIPP
PROFESSOR THOMAS E. PHIPPS
PROFESSOR RALPH L. SHRINER

Outline of Studies

Major Subject: Chemistry (Physical)
First Minor Subject: Organic Chemistry
Second Minor Subject: Physics

Thesis: THE TRANSFERENCE NUMBERS OF SOME RARE EARTH IONS

Summary

The transference numbers of the neodymium, samarium, and gadolinium ions, measured in 0.1N solutions of their chlorides, are 0.4424, 0.4422 and 0.4334 respectively.

The measurement, by the moving boundary method, consists of measuring the time required for a single descending boundary between two cations to move through a given volume. The concentration of the following lithium chloride solution is varied from 0.05N to 0.1N. Throughout this entire range the transference numbers of the leading rare earth ions are shown to vary less than 0.6 percent while the "apparent" transference numbers of the following lithium ion, calculated from the same formula, vary 50 percent from the accepted value. This not only supports Kohlrausch's conclusion that automatic concentration adjustment of the following solution to the ratio $n_L/c_L = n_F/c_F$ takes place, but suggests the following criterion for a suitable indicator ion concentration. When the apparent transference number of the following ion approaches within 2 percent of its accepted value at the concentration used the solution is within satisfactory concentration range.

The significance of the transference numbers of the rare earth ions is discussed from the point of view of mobility and ionic hydration.

EDUCATIONAL CAREER

A.B., Mt. Holyoke College, 1928

Assistant in Chemistry, University of Illinois, 1929-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ROBERT PHILLIP HACKETT

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

MONDAY, MAY 23, 1932, 3 P. M.
Room 420, Commerce Building

COMMITTEE IN CHARGE:

PROFESSOR MAURICE H. ROBINSON, *Chairman*
PROFESSOR EDWARD J. FILBEY
PROFESSOR MERLIN H. HUNTER
PROFESSOR ANANIAS C. LITTLETON
PROFESSOR HIRAM T. SCOVILL
PROFESSOR NATHAN A. WESTON

Outline of Studies

Major Subject: Economics

Minor Subject: Accountancy

Summary

The greatest industrial consolidation movement that the United States has ever known occurred during the years between 1898 and 1901. A smaller movement took place from 1925 to 1930; and it was during this latter period that the first important consolidation movement in the drug industry occurred. An investigation of the circumstances surrounding the consolidation in the drug industry indicates that there were sound reasons for the movement, and that it was not merely a case of imitating such procedures on the part of other industries. Some of the factors which fostered the movement in the drug industry were: the rapid growth of the chain drug store, the duplication of distribution, the advent of the cut price wholesaler, the noticeably larger profits of the larger concern, the desire on the part of the public for nationally advertised goods, the uneven wholesale distribution, and certain general characteristics of the industry. Two consolidations completely overshadow the entire movement in size. Drug, Incorporated is a consolidation comprising the manufacturing, wholesaling, and retailing branches of the industry. McKesson & Robbins is a consolidation of wholesalers primarily, although some attention is paid to manufacturing. There are several other consolidations of smaller size which are discussed in the study. Throughout the consolidations there has been no apparent attempt at monopoly shown, but various economies in operation have been sought after. The general method of financing the consolidations has been by means of the exchange of capital stock. Statistics on wholesale distribution indicate that drug distribution increased slightly over the period of 1928 and 1929 although general wholesale distribution was decreasing. Wholesale drug prices decreased more rapidly than general commodity prices in the period from 1913 to 1928. Internal results in relation to costs and turnover have been favorable to the consolidations, in spite of the depression period. The financial position, particularly the current position, of the consolidations has been sound even though profits have decreased. Labor has not been materially affected by the movement. The effect upon the consumer would be regarded advantageous if retail prices followed wholesale prices. The outlook for 1931 among the consolidations was that there would be no considerable decrease in volume and profits as compared with 1930.

EDUCATIONAL CAREER

B.S., University of Illinois, 1923

M.S., University of Illinois, 1926

Assistant and Instructor in Accountancy, University of Illinois, 1923-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HAN CHING YUAN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 19, 1932, 10 A. M.
Room 456, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR ROGER ADAMS, *Chairman*
PROFESSOR VINCENT DU VIGNEAUD
PROFESSOR WILLIAM C. ROSE
PROFESSOR RALPH L. SHRINER
PROFESSOR ELMER H. WILLIAMS

Outline of Studies

Major Subject: Chemistry (Organic)

First Minor Subject: Physiological Chemistry

Second Minor Subject: Physics

Thesis: I. STEREOISOMERISM OF DIPHENYLS

PREPARATION AND RESOLUTION OF FOUR SUBSTITUTED 2-METHOXY-2′-NITRO-6′-CARBOXYDIPHENYLS

II. SALTS OF DIIODOMETHANE DISULFONIC ACID

III. SYNTHESIS OF 2-MESITYL-1, 4-NAPHTHOQUINONE AND ITS DERIVATIVES

Summary

I.

Four unsymmetrical diphenyls have been prepared by Ullmann's reaction. They are 2, 5-dimethoxy-2′-nitro-6′-carboxydiphenyl, 2-methoxy-5-methyl-2′-nitro-6′-carboxydiphenyl, 2-methoxy-5-chloro-2′-nitro-6′-carboxydiphenyl and 2-methoxy-2′, 5-dinitro-6′-carboxydiphenyl. They form crystalline brucine salts. From each of them only one form of the brucine salt, *l*-brucine-*l*-acid salt, can be obtained in more than 90 percent yield of the total material. The brucine salts mutarotate in organic solvents at room temperature. The active *l*-acids have been obtained by decomposition of the brucine salts. They racemize readily in organic solvents at room temperature with different stereoisomeric half-life periods. The sodium salts of the *l*-acids racemize less readily in water but more readily in alcohol than the corresponding acids.

The theoretical basis of the effect of groups at positions other than 2,2′,6,6′ on the stereoisomeric stability of diphenyls has been discussed in some detail.

II.

The monosodium aminomethane disulfonate has been prepared and diazotized into the diazo salt which could not be isolated in the pure form. The sodium diiodomethane disulfonate has been prepared by two methods: (1) treating the sodium diazo salt with iodine, and (2) converting the potassium diiodomethane disulfonate with sodium perchlorate. Other salts of diiodomethane disulfonic acid, magnesium, calcium, ammonium, urea and diethylamine, have been prepared by treating the potassium diiodo salt with their corresponding perchlorates.

III.

2-Mesityl-1, 4-naphthoquinone has been prepared by Pummerer's reaction and then brominated to 2-mesityl-3-bromo-1, 4-naphthoquinone, and to 2-(3-bromo-2, 4, 6-trimethylphenyl)-3-bromo-1, 4-naphthoquinone. The 2-mesityl-3-bromo-1, 4-naphthoquinone has been nitrated to 2-(3, 5-dinitro-2, 4, 6-trimethylphenyl)-3-bromo-1, 4-naphthoquinone. Each 3-bromoquinone forms 3-ethoxyquinone. The 2-mesityl-3-ethoxy-1, 4-naphthoquinine condenses with acetyl chloride to form 2-(3-aceto-2, 4, 6-trimethylphenyl)-3-hydroxy-1, 4-naphthoquinone. Each 3-bromoquinone condenses with cyanoacetic ester in the presence of sodium ethylate. Upon hydrolysis, the condensation product from cyanoacetic ester forms a new type of heterocyclic compound, named temporarily as dehydro-quinone-acetoimide.

EDUCATIONAL CAREER

B.S., Tsing Hua University, 1929

Fellow in Chemistry, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

VERNAL RICHARD HARDY

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, May 25, 1932, 9 a. m.
Room 176, Chemistry Building

Committee in Charge:

Professor G. Frederick Smith, *Chairman*
Professor Harold W. Bailey
Professor Duane T. Englis
Professor Donald B. Keyes
Professor Worth H. Rodebush

Outline of Studies

Major Subject: Chemistry (Analytical)
First Minor Subject: Physical Chemistry
Second Minor Subject: Mathematics

Thesis: CHEMICAL REACTIONS IN THE SOLID STATE. PREPARATION OF ALKALINE EARTH METAL AND MAGNESIUM PERCHLORATES. REACTION BETWEEN SULFUR AND AMMONIUM PERCHLORATE.

Summary

1. A vacuum oven suitable for carrying out reactions in the solid state at temperatures below 300° C. and pressures below 5 millimeters of mercury was developed.

2. Alkaline earth metal and magnesium perchlorates were prepared by reactions between mixtures of the metal carbonates, oxides, or hydroxides with ammonium perchlorate.

The effects of pressure, temperature, time of heating, particle size, physical state of mixture, reactants used, and composition of the mixture, were studied.

The influence of the basicity of the metal salt and of the stability of the metal perchlorate ammine upon the reaction has been shown.

3. A thermal reaction piezometer has been designed and constructed in which the starting temperatures and the velocities of the above reactions and others have been determined by means of time-temperature-pressure curves.

The dissociation pressure of ammonium perchlorate over a range of temperatures has been determined.

4. The reaction between ammonium perchlorate and sulfur has been studied. The effects of particle size of reactants, their physical state, and the proportions in which they are mixed have been investigated.

Evidence has been obtained upon the products of ammonium perchlorate decomposition.

5. The applicability of various analytical procedures to the analyses of the mixtures obtained has been investigated.

EDUCATIONAL CAREER

B.S., McKendree College, 1928

M.S., University of Illinois, 1930

Scholar in Chemistry, University of Illinois, 1929-1930

Fellow in Chemistry, University of Illinois, 1930-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

MILES C HARTLEY

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, May 23, 1932, 4 p. m.
Room 254, Mathematics Building

Committee in Charge:

Professor Arnold Emch, *Chairman*
Professor Henry R. Brahana
Professor Robert D. Carmichael
Professor George A. Miller
Professor John E. Merrill

Outline of Studies

Major Subject: Mathematics (Geometry)
First Minor Subject: Analysis
Second Minor Subject: Astronomy

Thesis: PROPERTIES OF ALGEBRAIC, PLANE QUINTICS WHICH ARE INVARIANT UNDER FINITE COLLINEATION GROUPS

Summary

To the theory of curves of order higher than four which is known at present only in its rough outlines, this investigation contributes not only a study of the geometric properties of a number of quintics belonging to the general class of quintics invariant under finite collineation groups but also a method of procedure which can be easily extended to the remaining quintics and to curves of higher order possessing such collineation groups.

The general symmetric quintic passes through the isotropic points and has flexes at the three points of intersection of the sides of the coordinate triangle with the unit line; the other forty-two flexes lie on seven conics. If the cubic is rational, its six double points lie on a conic. To configurations of lines and conics on maps of the quintic correspond on the quintic configurations of cubics, quartics, sextics and octics invariant under the symmetric groups of order six; among them is included the systems of enveloping symmetric cubics and symmetric quartics.

From the collineation group under which a quintic is invariant the general quintic invariant under that group is derived. For the various quintics there are curves of order n which envelope the quintic or whose intersections with the quintic furnish configurations of curves of order m on the quintic.

EDUCATIONAL CAREER

A.B., University of Illinois, 1923

A.M., University of Illinois, 1924

B.S., University of Illinois, 1926

Instructor in Mathematics, LaSalle-Peru-Oglesby Junior College, LaSalle, Illinois, 1924-1930

Assistant in Mathematics, University of Illinois, 1930-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CLARENCE DUANE HAUSE

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

FRIDAY, MAY 27, 1932, 2 P. M.
Room 202, Physics Laboratory

COMMITTEE IN CHARGE:

PROFESSOR FRANCIS W. LOOMIS, *Chairman*
DOCTOR GERALD M. ALMY
PROFESSOR ROBERT D. CARMICHAEL
PROFESSOR CHARLES T. KNIPP
PROFESSOR P. GERALD KRUGER

Outline of Studies

Major Subject: Physics

Minor Subject: Mathematics

Thesis: THE BAND SPECTRUM OF POTASSIUM HYDRIDE

Summary

The band spectrum of potassium hydride was obtained by photographing the spectrum of a potassium arc in an atmosphere of hydrogen. The spectrum obtained extends from 4100A to 6500A and is similar to the singlet sigma to singlet sigma systems of LiH and NaH. The analyzed spectrum consists of 27 overlapping bands belonging to 5v′ progressions. A complete rotational analysis was obtained and the constants corresponding to the two states of the molecule computed.

EDUCATIONAL CAREER

A.B., Cornell College, 1927

A.M., University of Illinois, 1929

Assistant in Physics, University of Illinois, 1927-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WILLIAM FOLEY HENRY

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, May 16, 1932, 3 p.m.
Room 176, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR WORTH H. RODEBUSH, *Chairman*
PROFESSOR REYNOLD C. FUSON
PROFESSOR B. SMITH HOPKINS
PROFESSOR JOHN H. REEDY
PROFESSOR ELMER H. WILLIAMS

Outline of Studies

Major Subject: Chemistry (Physical)

Minor Subject: Physics

Thesis: PHYSICAL PROPERTIES OF SALT VAPORS

Summary

The purpose of this investigation was to determine the properties of certain salt molecules in the vapor state when in magnetic and electrostatic fields.

The salts studied were potassium chloride, caesium chloride and sodium chloride. The vaporized salt was in each case passed through a system of narrow slits, which served to select a class of molecules moving in a plane, or a molecular beam. By interposing a hot, positively charged tungsten filament in this beam, the latter can be located. The heated filament causes the dissociation of the salt molecule and in the case of potassium and caesium, the metallic ions evaporate as ions which can be collected on a negative plate and their presence can be determined by means of a galvanometer. By oxidizing the filament, it becomes sensitive also to sodium chloride. The beam was then surrounded in turn by magnetic and electrostatic fields and the beam relocated by means of the filament detector. A considerable broadening of the beam was observed in each case, showing that all salts studied have appreciable magnetic and electric moments in the vapor state. It is hoped that it will be possible to calculate the dipole moments of these salts from the data obtained.

EDUCATIONAL CAREER

B.S., University of Illinois, 1929

M.S., University of Illinois, 1930

Scholar in Chemistry, University of Illinois, 1929-1930

Assistant in Chemistry, University of Illinois, 1930-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

BENJAMIN HARVEY HILL

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, January 25, 1932, 9 a.m.
Room 108, Administration Building

COMMITTEE IN CHARGE:

PROFESSOR WALDO SHUMWAY, Chairman
PROFESSOR LEVERETT A. ADAMS
PROFESSOR THOMAS E. SAVAGE
PROFESSOR VICTOR E. SHELFORD
PROFESSOR HENRY B. WARD
PROFESSOR CHARLES ZELENY

Outline of Studies

Major Subject: Zoology

First Minor Subject: Systematic Zoology

Second Minor Subject: Paleontology

Thesis: THE DEVELOPMENT OF THE THYMUS AND THYROID GLANDS IN *Amia calva*

Summary

Anatomical criteria were established for seven developmental stages from 6–6.5 mm. to 12–13 mm.

Three pairs of thymus primordia are found at 6–6.5 mm. on the dorsal lateral ends of the second, third and fourth visceral pouches. Those on each side fuse by growth and migration and lie above the third visceral pouch, whence the thymus migrates upward and backward; growing in size, it stretches above the ends of the gill pouches. It pushes inward into the mesenchyme at 12–13 mm. and becomes surrounded and perforated by blood vessels and connective tissue which separate it almost completely from the epithelium. No septa are found; occasionally the third primordium fails to fuse and forms a separate lobe.

The early thymus is a syncytium in which are found lymphoblasts, identified by structure of the cytosome and its behavior during mitosis. Evidence is presented that lymphoblasts migrate into the thymus where they increase in number with corresponding increase in length of cytoplasmic bridges and size of intercellular spaces. At 10 mm. begins a rapid increase in size of the thymus and in number of lymphoblasts and decrease in size of the latter, culminating at 12–13 mm. in their transformation into thymocytes. A medulla associated with blood vessels is unmistakable at 30 mm.

The thyroid primordium is a solid median outgrowth from the pharynx which is attached to the bifurcation of the truncus arteriosus. By forward growth of the visceral region, the thyroid is detached from the pharynx and migrates to its definitive position ventral to the aorta between the bases of the third visceral pouches. After detachment the primary follicle appears in the lower part of the primordium; during migration and early growth it is divided by stress and pressure to form new follicles. New follicles are formed also by secretion between cells of solid thyroid masses and by pinching off evaginations from large follicles. Colloid appears soon after the primary follicle is divided. The adult thyroid is a group of follicles scattered in a venous plexus in the ventral pharyngeal region, around the aorta.

EDUCATIONAL CAREER

A.B., Texas Christian University, 1921

M.S., Texas Christian University, 1925

Assistant in Zoology, University of Illinois, 1925-1928

Field Assistant, Bureau of Fisheries, Ann Arbor, Michigan, 1928-1929

Professor of Biology, High Point (North Carolina) College, 1929-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JUDSON HARRY HOLLOWAY, JR.

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

FRIDAY, MAY 20, 1932, 10 A. M.
Room 176, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR NORMAN W. KRASE, *Chairman*
PROFESSOR DONALD B. KEYES
PROFESSOR CHARLES T. KNIPP
PROFESSOR THOMAS E. PHIPPS
PROFESSOR WORTH H. RODEBUSH

Outline of Studies

Major Subject: Chemistry (Industrial)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: THE SYNTHESIS OF BENZALDEHYDE FROM BENZENE AND CARBON MONOXIDE UNDER PRESSURE

Summary

The synthesis of benzaldehyde from benzene, aluminum chloride and carbon monoxide has been studied, using ratios of aluminum chloride to benzene of 0.3, 0.5, 0.75 and 1.0, carbon monoxide pressures from 300 to 2000 pounds per square inch and temperatures of 25, 35 and 50 degrees Centigrade, over periods of time varying from fifteen minutes to three hours.

The effect upon the reaction of adding small quantities of benzaldehyde to the initial mixtures of aluminum chloride and benzene has been studied.

An apparatus particularly suitable for the study of reactions involving agitation under high gas pressure has been developed.

EDUCATIONAL CAREER

B.S., University of Denver, 1924

M.S., University of Denver, 1926

Assistant in Chemistry, University of Illinois, 1929-1932

PUBLICATION

The occurrence and present chemical status of the female sex hormone. (With R. T. Frank, R. G. Gustavson, et al.) Endocrinology, *10,* 260 (1926)

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

LUCRETIA LITTLE ILSLEY

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, March 8, 1932, 3:30 p.m.
Room 424A, Library

COMMITTEE IN CHARGE.

PROFESSOR JOHN A. FAIRLIE, Chairman
PROFESSOR JAMES W. GARNER
PROFESSOR CHARLES M. KNEIER
PROFESSOR ALBERT H. LYBYER
PROFESSOR JOHN M. MATHEWS

Outline of Studies

Major Subject: Political Science

Minor Subject: History

Thesis: THE ADMINISTRATION OF MANDATES BY THE BRITISH DOMINIONS

Summary

Territories administered as C mandates by the British Dominions are: Western Samoa, a mandate of New Zealand, New Guinea, a mandate of Australia, Nauru, a British Empire mandate administered by Australia, and South-West Africa, a mandate of South Africa. The first four chapters of the thesis deal with the origin of the mandate system, the legal basis for the Dominions' control of their mandates, the status of the inhabitants of the mandates, and the forms of government established. Phases of administration considered in the next five chapters are: welfare programs and economic problems in the mandates, the functioning of the executive and legislative branches of government, judicial administration, the Public Service, and native administration. The last substantive chapter gives an account of the supervision of the Dominion mandatories by the Permanent Mandates Commission, Council, and Assembly of the League of Nations.

The Dominions have enjoyed the prestige attached to the position of mandatory as well as the added military security. Naturally, they have been interested in developing the economic resources of their mandates, among which, as yet, Nauru alone is really profitable. On the other hand, the Dominions, in accordance with Article 22 of the Covenant of the League, have also attempted to promote the welfare of the mandate inhabitants, though their efforts in this direction have been somewhat handicapped by financial difficulties (except in Nauru) and by a lack of trained staff. In South-West Africa, the only Dominion mandate where there is an appreciable European minority, the interests of the backward and often uncoöperative natives have been, to some extent, subordinated to those of the Europeans. In general, however, thanks to the supervision of the League and the collaboration of the mandatories, much higher standards of administration have been maintained in these mandates than the minimum standards tolerated in colonial possessions by world public opinion, though all the high sounding phrases of Article 22 of the Covenant may not be completely fulfilled.

EDUCATIONAL CAREER

A.B., Mount Holyoke College, 1928

A.M., University of Illinois, 1929

Scholar in Political Science, University of Illinois, 1928-1929

Fellow in Political Science, University of Illinois, 1929-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CLARENCE EDWARD IRELAND

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 26, 1932, 4 P. M.
Room 202, Physics Laboratory

COMMITTEE IN CHARGE:

PROFESSOR JAMES H. BARTLETT, *Chairman*
PROFESSOR ROBERT D. CARMICHAEL
PROFESSOR JAKOB KUNZ
PROFESSOR FRANCIS W. LOOMIS
PROFESSOR WILLIAM F. SCHULZ
PROFESSOR FLOYD R. WATSON

Outline of Studies

Major Subject: Physics

Minor Subject: Mathematics

Thesis: VALENCE FORCES IN BERYLLIUM HYDRIDE

Summary

The Heitler-London method of calculation has been applied to those states of BeH which dissociate into a normal hydrogen atom, and a beryllium atom in the ^1S (case one), ^3P (case two), and ^1P (case three) atomic states, respectively. In case one the $^2\Sigma$ molecular state is found to be repulsive. In case two, the $^4\Sigma$ and $^4\pi$ states are repulsive, while the $^2\Sigma$ and $^2\pi$ states are attractive. In case three, both the $^2\Sigma$ and $^2\pi$ states are found to be repulsive. Since the potential energy curves for the $^2\Sigma$ state of case one and the $^2\Sigma$ state of case two intersect, it is probable that the lowest $^2\Sigma$ state is, in reality, attractive, as given by experiment.

When a Heitler-London calculation is carried out for a heteronuclear molecule or a Hylleraas calculation applied to any diatomic molecule a type of integral arises for which there is at present no numerical tables of sufficient latitude. Consequently, tables for this type of integral have been computed.

EDUCATIONAL CAREER

A.B., University of Illinois, 1926

M.S., University of Illinois, 1928

Assistant in Physics, University of Illinois, 1926-32

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

MIMI IDA JEHLE

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

WEDNESDAY, MAY 18, 1932, 4 P. M.
Room 217, Lincoln Hall

COMMITTEE IN CHARGE:

PROFESSOR ALBERT W. ARON, *Chairman*
PROFESSOR NEIL C. BROOKS
PROFESSOR DAVID H. CARNAHAN
PROFESSOR RÉGIS MICHAUD
PROFESSOR CHARLES A. WILLIAMS

Outline of Studies

Major Subject: German

Minor Subject: French

Thesis: DAS DEUTSCHE KUNSTMÄRCHEN VON DER ROMANTIK ZUM NATURALISMUS

(The German Literary Fairy-tale from Romanticism to Naturalism.)

Summary

This study reviews in Chapter I the development of the romantic literary fairy-tale on the basis of existing critical works. Although Eichendorff is a romanticist, he has not been included in these investigations and the second chapter is therefore devoted to him. The remaining seven chapters represent the first attempt to show the development of the literary fairy-tale in the realistic period.

The realistic period is divided into two parts, the beginnings of realism in *Das Junge Deutschland* (chapter III) and in Hauff, Platen and Gotthelf (chapter IV). Chapters I-IV of the second part are devoted to poetic realism, while the last chapter is an attempt to fix the general characteristics of the realistic fairy-tale, giving at the same time a suggestion of its further development.

Instead of accepting the folk fairy-tale as the sole measure of excellence, as has been done in previous studies, this investigation shows how the literary fairy-tale, like any other individual work of art, reflects the character of its author and its period.

EDUCATIONAL CAREER

B.E., University of Akron, 1928

A.M., University of Illinois, 1929

Assistant in German, University of Illinois, 1928-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

GARRET LOWELL JORDAN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

MONDAY, NOVEMBER 21, 1932, 1 P.M.
Room 420, Commerce Building

COMMITTEE IN CHARGE:

PROFESSOR CHARLES L. STEWART, *Chairman*
PROFESSOR LESLIE E. CARD
PROFESSOR MERLIN H. HUNTER
PROFESSOR SIMON LITMAN
DEAN HERBERT W. MUMFORD
PROFESSOR LAURENCE J. NORTON
PROFESSOR NATHAN A. WESTON

Outline of Studies

Major Subject: Economics

First Minor Subject: Agricultural Economics

Second Minor Subject: Animal Husbandry

Thesis: CHANGING FOOD HABITS IN RELATION TO LAND UTILIZATION IN THE UNITED STATES

Summary

Food habits have been among the major factors affecting the acreage requirements for food and feed crops in the United States. Some of the more important changes in food consumption after 1909 have been: decreases in the per capita consumption of corn meal, wheat flour, and beef; and increases in the per capita consumption of sugar, vegetables, fresh and canned, most fruits, especially citrous fruits, vegetable oils, pork, and milk. Some of these changes began before 1909; others have been largely post-war developments.

Changes in food habits in foreign countries during this period were not uniform either in direction or degree for the world as a whole, but there was a tendency toward generally lower per capita consumption of wheat and rye and higher per capita consumption of sugar.

The additional quantities of foodstuffs consumed by the increased population in the United States more than offset the decrease that would have resulted from lower per capita consumption of some of the principal foodstuffs. The rate of increase in population has declined so rapidly in the United States since 1919 that a stationary population is anticipated in approximately twenty-five years.

The principal food-importing nations, including Great Britain, France, Germany, and Italy, have put additional barriers against imports of foodstuffs from the United States. The principal food-exporting nations, including Canada, Argentina, Australia, New Zealand, and Union of South Africa, have increased their production more rapidly than has the United States and are tending to force the United States out of the export market for foodstuffs.

Improvements in agricultural production have been adopted by more and more farmers during the last two decades, with the result that fewer acres are required to produce a given quantity of foodstuffs.

A probable reduction in acreage required to produce food and feed crops, other than pasture, in the United States during the next twenty-five years is indicated as the result of changes in food habits, the slowing down of the growth of population, increasing competition in the production of foodstuffs for a declining export market, and the adoption of improved practices in agricultural production in the United States.

EDUCATIONAL CAREER

B.S., Purdue University, 1922

A.M., University of Illinois, 1929

Research Assistant in Agricultural Economics, University of Illinois, 1927-1928

Assistant in Poultry Husbandry, University of Illinois, 1928-1929

Assistant to the Dean, College of Agriculture, and to the Director, Agricultural Experiment Station and Agricultural Extension Service, University of Illinois, 1929-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WILBERT EUGENE KARRENBROCK

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

SATURDAY, MAY 28, 1932, 9 A. M.
Room 420, Commerce Building

COMMITTEE IN CHARGE:

PROFESSOR MERLIN H. HUNTER, *Chairman*
PROFESSOR LLOYD MOREY
PROFESSOR FREDERIC A. RUSSELL
PROFESSOR HIRAM T. SCOVILL
PROFESSOR NATHAN A. WESTON
PROFESSOR IVAN WRIGHT

Outline of Studies

Major Subject: Economics

First Minor Subject: Accountancy

Second Minor Subject: Business Organization and Operation

Thesis: THE ADMINISTRATION OF MUNICIPAL FUNDS WITH SPECIAL REFERENCE TO ILLINOIS CITIES

Summary

The study of the administration of municipal funds has been of interest to American writers on Public Finance for more than thirty years. The total annual expenditure from municipal funds of the United States is greater than the annual expenditure of our federal government. There has been an upward trend in the per cent of total municipal expenditure to the total national income. The total and per capita expenditure of Illinois cities has shown an increase.

The administration of municipal funds includes budgeting; appropriating; collection, custody, and disbursement of funds; and auditing and preparation of financial statements. The law is both incomplete and indefinite in stating practices of administration that should be followed. Between seventy-five and eighty per cent of the fifty-six cities studied, do not prepare a budget. All, except one, prepare and pass an appropriation ordinance. The records of many cities are so incomplete and inaccurate that it would be difficult to prepare a budget, such as good business practice and the statutes require.

The appropriation ordinance is too often considered to be only a legal necessity and not a valuable aid to the control of municipal expenditures. A number of city officials do not distinguish properly between the appropriation and the tax levy ordinance. Proper segregation of assets, liabilities, incomes, and expenses of various funds has not been made. Some required funds have not been maintained by approximately fifty per cent of the cities. There exists a lack of uniformity as to conditions under which municipalities deposit funds. Internal control and internal auditing are absent in most municipalities. The audits and financial statements which are prepared by public accountants are of a great variety and often incomplete.

It is hoped that the results of this study will cause a greater interest in the proper handling of municipal funds and that there will be an improvement in the requirements of the state statutes. There should be better choice of certain city officials and office personnel. There should be a higher standard maintained in accounting practices. More thorough and more uniform auditing procedure is desirable and more valuable statements should be furnished by both the cities and the accounting firms.

EDUCATIONAL CAREER

A.B., Central Wesleyan College, 1921

B.S., University of Illinois, 1923

M.S., University of Illinois, 1924

Assistant and Instructor in Accountancy and Business Organization and Operation, University of Illinois, 1923-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

William Christian Klingelhoefer, Jr.

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Tuesday, May 24, 1932, 3 p. m.
Room 176, Chemistry Building

Committee in Charge:

Professor Worth H. Rodebush, *Chairman*
Professor Donald B. Keyes
Professor Norman W. Krase
Professor Thomas E. Phipps
Professor Elmer H. Williams

Outline of Studies

Major Subject: Chemistry (Physical)
First Minor Subject: Chemical Engineering
Second Minor Subject: Physics

Thesis: ATOMIC CHLORINE AND ITS REACTIONS

Summary

Atomic chlorine was produced by an electrodeless discharge at low pressure. The degree of dissociation was measured by a diffusion method.

The catalytic activity of several materials for the recombination of the chlorine atoms was studied. Some very efficient catalysts were found.

Several reactions of chlorine atoms were observed. The rate of the reaction with hydrogen was studied by a flow method.

The relation of the results to the interpretation of some of the reactions of chlorine has been discussed.

EDUCATIONAL CAREER

B.S., University of Pittsburgh, 1925

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

EDWIN GEORGE KOCH

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

MONDAY, SEPTEMBER 26, 1932, 1 P.M.
Room 176, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR G. FREDERICK SMITH, *Chairman*
PROFESSOR DUANE T. ENGLIS
PROFESSOR REYNOLD C. FUSON
PROFESSOR CHARLES T. KNIPP
PROFESSOR WORTH H. RODEBUSH

Outline of Studies

Major Subject: Chemistry (Analytical)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: PREPARATION AND PROPERTIES OF THE ALKALI AND ALKALINE EARTH METAL PERCHLORATE AMMINES

Summary

1. The perchlorate ammines of calcium, barium, strontium and magnesium were prepared by the use of four different methods.

2. The composition of the newly prepared perchlorate ammines was determined by analysis and by synthesis using the method of isothermal decomposition starting with the higher ammines.

3. The perchlorate ammines thus prepared and studied were the following:

$Mg(NH_3)_6(ClO_4)_2$,	$Mg(NH_3)_2(ClO_4)_2$	
$Ca(NH_3)_6(ClO_4)_2$,	$Ca(NH_3)_4(ClO_4)_2$,	$Ca(NH_3)_2(ClO_4)_2$
$Sr(NH_3)_7(ClO_4)_2$,	$Sr(NH_3)_6(ClO_4)_2$,	$Sr(NH_3)_4(ClO_4)_2$
$Ba(NH_3)_6(ClO_4)_2$,	$Ba(NH_3)_2(ClO_4)_2$	

4. The technique involved in the study of the isothermal decomposition and temperature-pressure relationships using the thermal reaction piezometer was improved in its application to the particular problem at hand.

5. The density of the anhydrous perchlorates and of the various perchlorate ammines was determined, employing the usual pycknometer method. The mean value for the molecular volume of ammonia found from these measurements was 22.54 which is in good agreement with values found by Biltz, Clark and Ephraim.

6. A study was made of the possibility of preparation of the perchlorate ammines from the hydrated perchlorates and the reaction found to be reversible depending upon the partial pressure of ammonia and water vapor employed.

7. A qualitative investigation of the prechlorate ammine solubilities in various solvents was made.

EDUCATIONAL CAREER

A.B., State University of Montana, 1928

Assistant in Chemistry, University of Illinois, 1928-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

EMILIE IDA WALZ KUBITZ

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, MAY 24, 1932, 4 P. M.
Room 217, Lincoln Hall

COMMITTEE IN CHARGE:

PROFESSOR ALBERT W. ARON, *Chairman*
PROFESSOR NEIL C. BROOKS
PROFESSOR DAVID H. CARNAHAN
PROFESSOR RÉGIS MICHAUD
PROFESSOR CHARLES A. WILLIAMS

Outline of Studies

Major Subject: German Literature
First Minor Subject: Philology
Second Minor Subject: French

Thesis: DIE AUFFASSUNG DER LIEBE IM POETISCHEN REALISMUS

(The Conception of Love in Poetic Realism)

Summary

To the romanticists love between man and woman was a supernatural force which led to the highest development of an egotistical self. In their interpretation of love the poetic realists incorporate this idea of self-development, but they also ascribe to love the power which inculcates strength of renunciation, endurance, humble resignation, the willingness to help and the courage of sacrifice.

Mörike finds the fate of man largely determined by transcendental, spiritualistic influences, and these elements so predominate, that even in love he fails to find the desired harmony between them and reality.

For Storm love is the power which represents religion, cosmos, universe, all. Only in the love between two beings can the transitoriness of life, the fear of death, be overcome. Ethical standards govern all problems of love; its inherent qualities make for self-discipline and self-perfection and continuous moral and spiritual growth.

Keller sees in love the synthesis of the spiritual and sensual. It must rest on real, true, natural inclinations, and out of these honest and intuitive instincts it will create its own ethical laws, which will lead to enduring happiness.

Raabe finds ideal love in spiritual harmony. It alone brings understanding of and meaning to the universe and to existence. It frees the circumscribed being and leads to metaphysical heights and to the far reaches of mystic experience.

Fontane, though he deals with the problems of free love and divorce, knows neither moral laxness nor moralizing bigotry. The essence of his conception is that man is free to follow his own inclinations, but he must be willing to accept the natural consequences. The wishes of the individual must finally be subject to the will of the whole; for greater than the strength of the heart are its weaknesses and vacillations. For Fontane, as for all of these poetic realists, the "old manner of sincere love" is the simplest, most natural, and most enduring.

EDUCATIONAL CAREER

A.B., University of Illinois, 1916

A.M., University of Illinois, 1930

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JOHN WILLIAM KURTZ

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 26, 1932, 4 P. M.
Room 217, Lincoln Hall

COMMITTEE IN CHARGE:

PROFESSOR NEIL C. BROOKS, *Chairman*
PROFESSOR ALBERT W. ARON
PROFESSOR MATTHEW T. MCCLURE
PROFESSOR GUY A. TAWNEY
PROFESSOR CHARLES A. WILLIAMS

Outline of Studies

Major Subject: German

First Minor Subject: Philology

Second Minor Subject: Philosophy

Thesis: STUDIES IN THE STAGING OF THE GERMAN RELIGIOUS DRAMA OF THE LATE MIDDLE AGES

Summary

These studies in the staging of the late medieval religious drama of Germany have two aims. The first one is to give a systematic description of stage and players built up from the scattered information in stage directions, texts of plays and published archives. Such a description has never been worked out for Germany, although it has been done for France. The second aim is to throw light upon a limited number of moot questions by giving them, in the course of the description, some special consideration. The investigation falls into three parts.

The first part discusses the stage facilities proper, describing the nature of the medieval stage, its location and construction, its settings and their arrangement, and the movements of the actors upon the stage.

The second part considers the development of the processional plays in their relation to the drama of the fixed stage, describes the manner of presentation of the processional plays, and traces their influence upon the staging of the religious drama. The final conclusion reached in this part of the investigation is that this influence, though present to a certain extent, is not as marked as it has been considered to be in previous studies on the subject.

The third part consists of a description of the players with reference to their station in life, their qualifications and abilities as actors, their selection and remuneration, their gestures and costumes.

EDUCATIONAL CAREER

B.A., Wartburg College, 1927

M.A., University of Illinois, 1929

Assistant in German, University of Illinois, 1927-1929, 1930-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ERNEST GILMORE LEWIS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 26, 1932, 3 P. M.
Room 420, Commerce Building

COMMITTEE IN CHARGE:

PROFESSOR NATHAN A. WESTON, *Chairman*
PROFESSOR ERNEST L. BOGART
PROFESSOR JAMES W. GARNER
PROFESSOR MERLIN H. HUNTER
PROFESSOR FREDERIC E. LEE
PROFESSOR IVAN WRIGHT

Outline of Studies

Major Subject: Economics

First Minor Subject: Public Finance

Second Minor Subject: Political Science

Thesis: SOME CONTRIBUTIONS OF JOHN SHERMAN TO PUBLIC AND PRIVATE FINANCE, 1855-1881

Summary

The subjects of taxation, public indebtedness, money, banking, and resumption of specie payments were many times discussed by John Sherman between 1855 and 1881. He was Chairman of the Committee on Ways and Means for two years, a member of the Senate Finance Committee for sixteen years and its Chairman for ten years, and Secretary of the Treasury, 1877-1881. In these capacities Mr. Sherman greatly influenced the solution of problems in public and private finance.

Mr. Sherman made contributions to economic theory and practice. His opinions on taxation were for the most part justifiable and consistent with classical principles, which he accepted as the basis of his own theories. His chief contribution to principles of taxation was his advocacy and excellent discussions of an income tax as a peace-time measure. His influence in appreciating the public credit, on legislation regarding tax-exempt securities, and in the great refunding operations which saved the country annually over fourteen million dollars interest, marked him as an outstanding finance minister.

Although Mr. Sherman was inconsistent regarding a monetary standard, he reached the conclusion that gold must be the standard; that silver coins and paper money may supplement gold if they are limited in quantity and legal tender quality, and kept at par with gold by being redeemable in gold on demand. He saved the country from a silver standard by interpreting *specie* to mean *gold* payments.

Mr. Sherman was one of the founders of the national banking system. He several times defended national banks, pointing out their advantages over state banks, but remained an indifferent supporter and critic of national banks. His greatest contribution to posterity was in connection with the successful resumption of specie payments. Despite a hostile Congress, threatened repeal of the resumption act, silver legislation, and lack of popular support, Secretary Sherman was prepared to resume specie payments in gold on January 1, 1879. He harnessed all favorable forces—a low interest rate, good harvests at home and crop failures abroad, propitious trade conditions including a favorable balance of payments, et cetera—to work for his cause.

EDUCATIONAL CAREER

A.B., University of Texas, 1926

A.M., University of Texas, 1928

Assistant in Economics, University of Illinois, 1929-1931

Fellow in Economics, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JOHN FRANKLIN LOCKE

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

MONDAY, DECEMBER 19, 1932, 4 P.M.
Room 254, Mathematics Building

COMMITTEE IN CHARGE:

PROFESSOR ROBERT D. CARMICHAEL, *Chairman*
PROFESSOR HENRY R. BRAHANA
PROFESSOR ARNOLD EMCH
PROFESSOR MATTHEW T. MCCLURE
PROFESSOR JAMES B. SHAW

Outline of Studies

Major Subject: Mathematics

First Minor Subject: Geometry

Second Minor Subject: Philosophy

Thesis: REPEATED SUMS OF CERTAIN FUNCTIONS

Summary

In this paper some of the results contained in an as yet unpublished paper by Professor R. D. Carmichael, "Summation of Functions of a Complex Variable," are extended so as to apply to a more general class of functions than is there considered. A repeated difference equation involving this class of functions is then studied. Particular repeated difference equations are treated and solutions of these are found which are combined so as to give rise to certain classic functions from which the theory of elliptic functions may be developed.

EDUCATIONAL CAREER

B.S., West Tennessee State Teachers College, 1927

M.A., Vanderbilt University, 1929

Graduate Teaching Fellow in Mathematics, Vanderbilt University, 1928-1929

Assistant in Mathematics, University of Illinois, 1929-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

KENNETH DEAN LUNEY

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

WEDNESDAY, MAY 25, 1932, 3 P. M.
Room 420, Commerce Building

COMMITTEE IN CHARGE:

PROFESSOR EDWARD BERMAN, *Chairman*
PROFESSOR ERNEST L. BOGART
PROFESSOR PAUL D. CONVERSE
PROFESSOR CHARLES L. STEWART
PROFESSOR NATHAN A. WESTON
PROFESSOR IVAN WRIGHT

Outline of Studies

Major Subject: Economics

Minor Subject: Marketing

Thesis: MR. JUSTICE BRANDEIS AND THE PROBLEMS OF LABOR

Summary

Mr. Brandeis has long been an exponent of social justice. To his mind social justice is a necessary incident of real democracy. He attributed much of our industrial unrest to the contrast between political democracy and industrial autocracy. To bring about democracy in industry he believed it necessary to have parties equal in bargaining power, and he advocated the organization of workers that they might bargain collectively with employers and employers' associations. A formal system of arbitration would take care of all disputed points. If unions were unable to gain a foothold to improve conditions, government interference would be necessary.

Scientific management was advocated to secure an increase in the output of industry. Labor through collective bargaining was expected to obtain the greater part of the increase. Shorter working periods would permit the opportunity for education and fulfillment of the duties of a citizen. There were many other problems that could be solved by social "invention" and intelligence.

Mr. Brandeis as a justice has looked with favor upon the use of the police power by the state legislatures to pass protective legislation. The legislatures, as well as Congress, have the right to experiment in social legislation and can best express the views of the people. The law as he viewed it must be a living thing, based on facts and alive to changing conditions. There should be no judicial interference unless the act was unmistakably in excess of the police power.

EDUCATIONAL CAREER

A.B., Geneva College, 1924

A.M., University of Illinois, 1928

Assistant in Economics, University of Illinois, 1926-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HAROLD ROSS McLARTY

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Friday, May 20, 1932, 2 p.m.
Room 305, Natural History Building

COMMITTEE IN CHARGE:

PROFESSOR CHARLES F. HOTTES, *Chairman*
PROFESSOR JOHN T. BUCHHOLZ
PROFESSOR CLELL L. METCALF
PROFESSOR FRANK L. STEVENS
PROFESSOR ARTHUR G. VESTAL

Outline of Studies

Major Subject: Botany (Plant Pathology)
First Minor Subject: Plant Physiology
Second Minor Subject: Entomology

Summary

The thesis presents an interpretation of the perennial canker problem. This new disease of apple trees which occurs only in Oregon, Washington and British Columbia advances rapidly in districts where ordinary diseases gain no headway even when no control measures are practised. It is apparent that there are factors governing the incidence of the disease other than those commonly associated with the existence of most fungous diseases.

Evidence is brought forth to show that there are three limiting factors which govern the occurrence of perennial canker. These are the presence of the fungus *Gloeosporium perennans* Zeller & Childs an infestation in the orchard of woolly apple aphis *Schizoneura lanigera* Hausmann and the exposure of the host to freezing temperatures during the dormant season.

The absence of any one of these three factors prevents the occurrence of the disease. Their combined presence assures its development. The severity of its occurrence depends upon the strength of each of these three factors and the presence of a number of other contributory factors. The contributory factors are precipitation, winter injury, pruning during the months of November and December, and poor cultural conditions.

The life history of the fungus associated with the disease is presented. Its strong saprophytic nature is stressed and details are given of its parasitism in the host. The fact that it becomes a parasite only after the host is brought into a correct physiological condition through exposure to low temperatures suggests that the causal organism is only a facultative parasite. In the live host tissue, it has but an annual existence. New infections in cankers arise only through new inoculations.

The agent performing the inoculation operation is the woolly apple aphis. The time during which this inoculation can be induced by the aphis has been found to be after the end of July; infestation previous to this time does not bring about infection.

Satisfactory control measures have not yet been developed. From results in experiments on control, suggestions are given as to the best means of handling the problem.

In the literature cited, a review is given of all the papers on the subject up to the present.

EDUCATIONAL CAREER

B.A., McMaster University, 1916

M.A., McMaster University, 1920

Scholar in Botany, University of Illinois, 1920-1921

Assistant in Botany, University of Illinois, 1929-1930

Officer-in-charge, Dominion Field Laboratory of Plant Pathology, Summerland, B. C., Canada, 1921-.

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

MARION ELSIE MACLEAN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, SEPTEMBER 15, 1932, 3 p.m.
Room 176, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR ROGER ADAMS, *Chairman*
DOCTOR GERALD M. ALMY
PROFESSOR REYNOLD C. FUSON
PROFESSOR DONALD B. KEYES
PROFESSOR ROBERT F. PATON
PROFESSOR WORTH H. RODEBUSH

Outline of Studies

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: I. A STUDY OF THE STEREOISOMERISM OF SOME SULFUR COMPOUNDS.

II. A SEARCH FOR A NEW TYPE OF STEREOISOMERISM.

Summary

I.

2, 5–Diphenylthiohydroquinone–1, 4–diacetate has been prepared by a series of reactions described by Posner and the compound oxidized to the disulfoxide which, theoretically, should exist in two diastereoisomeric forms, meso and racemic. By fractional crystallization two disulfoxides have been isolated and oxidized to the same disulfone, verifying predictions. Both likewise have been reduced to the parent disulfide thus eliminating a sulfide-sulfone constitution. The isomers differ markedly in melting point, solubility, and crystalline form.

Attempts to convert the compound to the 1, 4–diacetic acid failed due to decomposition of the material; it was therefore not possible to resolve the racemic modification. Efforts to synthesize a derivative with a carboxyl group in the benzene ring proved impractical.

Explanations for the existence of stereoisomerism in sulfoxides have been discussed.

II.

The 3, 3′–diamino derivatives of dimesityl sulfone, dimesityl ketone, and dimesityl methane have been synthesized. If the central carbon or sulfur atom in these compounds had a perfect tetrahedral structure, interference between ortho substituents in the mesityl groups should result and the compounds consequently should exist in enantiomorphous modifications. The failure of these compounds to resolve points to a distorted tetrahedral structure in which the angle between the mesityl groups is 133° or greater. The question of valence deflexion has been considered, with special reference to carbon. Incidental to the main problem, several other compounds have been synthesized.

EDUCATIONAL CAREER

B.A., Mount Holyoke College, 1924

M.A., Mount Holyoke College, 1926

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

EDWARD MERRILL McMAHON

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

MONDAY, MAY 23, 1932, 10 A. M.
Room 176, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR ROGER ADAMS, *Chairman*
DOCTOR JOHN C. BAILAR
PROFESSOR CARL S. MARVEL
PROFESSOR WILLIAM C. ROSE
PROFESSOR FRED W. TANNER

Outline of Studies

Major Subject: Chemistry (Organic)
First Minor Subject: Physiological Chemistry
Second Minor Subject: Bacteriology

Thesis: A COMPARISON OF THE METHOXYL AND FLUORINE GROUPS IN THEIR INFLUENCE ON THE RESTRICTION OF ROTATION IN ORTHO SUBSTITUTED DIPHENYLS

Summary

Experiments have been made to determine the relative size of the methoxyl and fluorine groups. The active forms of 2, 2′–dimethoxy–6, 6′–dicarboxydiphenyl were found to be much more difficult to racemize than the active forms of 2, 2′–difluoro–6, 6′–dicarboxydiphenyl, which was prepared by Stanley and Adams. This indicates that the methoxyl group is much larger than the fluorine group. The half-life periods of 2, 2′–dimethoxy–6, 6′–dicarboxydiphenyl were as follows: In boiling 0.1 N sodium hydroxide solution, 7 hours, 50 minutes; in boiling sodium ethylate solution, 11 hours; in boiling 95 per cent alcohol, 61 hours, 30 minutes; in boiling glacial acetic acid, 78 minutes.

It was found possible to prepare the active dimethyl esters and diamides of the active 2, 2′–dimethoxy–6, 6′–dicarboxydiphenyls, indicating that such active compounds can undergo at least certain types of reactions without appreciable racemization taking place.

An attempt was made to prepare an ortho disubstituted diphenylcyclopentadienone, which would be analogous to the diphenyl benzenes and which should exist in meso and racemic modifications. Although benzil reacts with dibenzyl ketone to form tetraphenylcyclopentadienone, attempts to prepare homologs by condensation of dibenzyl ketone with 0, 0′– and even m, m′– and p, p′–disubstituted benzils, were unsuccessful. Thus it appears that this reaction is limited to unsubstituted benzil.

EDUCATIONAL CAREER

B.S., Illinois Wesleyan University, 1927

M.S., University of Illinois, 1929

Assistant in Chemistry, University of Illinois, 1928-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

RALPH EDWARD MEINTS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

MONDAY, MAY 23, 1932, 3 P. M.
Room 105, Chemistry Annex

COMMITTEE IN CHARGE:

PROFESSOR B. SMITH HOPKINS, *Chairman*
DOCTOR JOHN C. BAILAR
PROFESSOR DUANE T. ENGLIS
PROFESSOR CHARLES T. KNIPP
PROFESSOR G. FREDERICK SMITH

Outline of Studies

Major Subject: Chemistry (Inorganic)
First Minor Subject: Analytical Chemistry
Second Minor Subject: Physics

Thesis: OBSERVATIONS ON THE RARE EARTHS: PREPARATION AND PROPERTIES OF LANTHANUM AMALGAM LANTHANUM METAL AND ITS STRUCTURE

Summary

1. Amalgams containing up to two percent lanthanum have been made by the electrolysis of concentrated aqueous solutions of lanthanum chloride with a mercury cathode.

2. Amalgams of a higher rare earth content have been made with less attendant decomposition by the use of solutions of the anhydrous or monohydrated chlorides and bromides in alcohol.

3. The amalgams are pasty, semi-solid masses which rapidly decompose in moist air with the formation of a basic carbonate. They can be concentrated to a powdery mass by heating in a vacuum.

4. The amalgams can be used directly in a mercury vapor lamp, and the light produced shows the spectra of the rare earths with the spectroscope, but little difference in color is observable with the unaided eye.

5. The amalgams have been heated in special rare earth oxide lined crucibles in a high vacuum and all of the mercury expelled. Coherent lumps of the rare earth metals have been obtained.

6. The crystal lattice of the solid metal has been determined by an x-ray study. A close packed hexagonal structure has been found.

7. An improved method for the preparation of selenium sulfide for use in testing for mercury vapor has been developed. This test has been found sufficiently sensitive to detect smaller amounts of mercury than will cause poisoning.

EDUCATIONAL CAREER

B.S., Iowa State College, 1927

M.S., Iowa State College, 1928

Assistant in Chemistry, University of Illinois, 1929-1931

Fellow in Chemistry, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

FRITZ MOORE

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

FRIDAY, MAY 27, 1932, 2:30 P. M.
Room 217, Lincoln Hall

COMMITTEE IN CHARGE:

PROFESSOR ALBERT W. ARON, *Chairman*
PROFESSOR NEIL C. BROOKS
PROFESSOR WALTER J. GRAHAM
PROFESSOR GLENN R. MORROW
PROFESSOR CHARLES A. WILLIAMS

Outline of Studies

Major Subject: German

First Minor Subject: Philology

Second Minor Subject: English

Thesis: THE ATTITUDE OF THE OLDER ROMANTICISTS TOWARDS LESSING

Summary

This study aims to determine the relationship that existed between the rationalist Lessing and the older group of romanticists, comprised of Friedrich Schlegel, August Wilhelm Schlegel, Novalis, Heinrich Wackenroder, and Ludwig Tieck.

The rationalists accepted Lessing as leader; but the romanticists, although they discounted Lessing's work as dramatist, poet, and critic, strove to save him from the rationalists, making a romantic figure of Lessing in the process. Their structure of proof rests on Lessing's religious writings, his polemics, his alleged romantic style, and his philosophic system, or rather lack of system. It is to be determined just how far they judged Lessing correctly and how far they misinterpreted his writings in order to fit him into their pre-conceptions and their desire to make a romanticist of him and to use him as a figure in their polemics against the rationalists.

EDUCATIONAL CAREER

A.B., University of Akron, 1927

A.M., University of Illinois, 1930

Assistant in German, University of Illinois, 1928-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HOWARD EVERETT MUNRO

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, MAY 17, 1932, 10 A. M.
Room 456, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR CARL S. MARVEL, *Chairman*
PROFESSOR VINCENT DU VIGNEAUD
PROFESSOR WILLIAM C. ROSE
PROFESSOR RALPH L. SHRINER
PROFESSOR FRED W. TANNER

Outline of Studies

Major Subject: Chemistry (Organic)
First Minor Subject: Physiological Chemistry
Second Minor Subject: Bacteriology

Thesis: TETRAPHENYLDIPHENYLETHINYLETHANE

Summary

1. Tetraphenyldiphenylethinylethane has been prepared and has been found to be different from the hydrocarbon, $C_{42}H_{30}$, prepared by Moureu, Dufraisse and Houghton by the action of iron on diphenylphenylethinylchloromethane.

2. Tetraphenyldiphenylethinylethane absorbs bromine and oxygen very rapidly, is cleaved by 40 per cent sodium amalgam but not by one per cent sodium amalgam and upon standing in solution at room temperature rearranges with extreme ease to $C_{42}H_{30}$ and an isomeric hydrocarbon.

3. Moureu's hydrocarbon, $C_{42}H_{30}$, does not absorb bromine or oxygen and does not cleave with 40 per cent sodium amalgam but adds sodium.

EDUCATIONAL CAREER

B.S., Illinois Wesleyan University, 1928

M.S., University of Illinois, 1929

Assistant in Chemistry, University of Illinois, 1928-1931

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

EDWARD FREDERICK NICKOLEY

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Monday, January 25, 1932, 3 p.m.
Room 420, Commerce Building

COMMITTEE IN CHARGE:

PROFESSOR ERNEST L. BOGART, Chairman
PROFESSOR JAMES W. GARNER
PROFESSOR SIMON LITMAN
PROFESSOR ALBERT H. LYBYER
PROFESSOR MAURICE H. ROBINSON
PROFESSOR NATHAN A. WESTON

Outline of Studies

Major Subject: Economics

First Minor Subject: Education

Second Minor Subject: Political Science

Summary

1. The Mandates entrusted by the League of Nations to Great Britain and France are based upon the theory that the guardian power shall hasten the progress of its ward in capacity for political independence.

2. The capacity for self-government is closely correlated with economic efficiency and economic independence.

3. A partial test of the mandatory principle and of the effectiveness of any particular mandate must be the economic development of the subject people.

4. If such a test is, at any time, to be applied, it is essential that an inventory should be made at the beginning of the period under survey, of economic conditions then prevailing, also of potentialities in this field of activity.

5. Syria is not an industrial country, manufactures being of little and declining importance.

6. Syria is essentially an agricultural country, but is seriously limited in the quality and quantity of agricultural resources.

7. To bring about improvement in agriculture more modern and more scientific methods must be employed than those at present in use. Before this, however, marketing facilities for native produce must be developed.

8. The second possibility for the attainment of a greater measure of economic prosperity lies in restoring Syria's former place in the entrepot trade. A third line is the exploitation of the climatic and scenic resources in the form of tourist business.

9. The development of native enterprise in all these lines is handicapped by,

a. Conservatism on the part of the people and their inability to combine for large scale undertakings,

b. The restrictions inherent in the frontiers traced with little regard for the economic needs of the countries concerned.

c. The financial burden thrown upon the producers in the form of taxes for the maintenance of the government.

10. Syria is potentially amply supplied with capital, also with labor, both skilled and unskilled. The question is whether, under the mandatory administration these can be organized and effectively applied to the resources of the country.

EDUCATIONAL CAREER

A.B., University of Illinois, 1898

A.M., University of Illinois, 1915

Assistant in Economics, University of Illinois, 1914-1916, 1923-1924

Professor of Economics, American University of Beirut, Syria, 1916

Acting President, 1919-1923, Dean of the School of Arts and Sciences, 1924-1931

Visiting Professor of Economics, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

RALPH EMERSON NUSBAUM

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, March 2, 1932, 4 p. m.
Room 202, Physics Building

COMMITTEE IN CHARGE:

PROFESSOR FRANCIS W. LOOMIS, *Chairman*
DOCTOR GERALD M. ALMY
PROFESSOR P. GERALD KRUGER
PROFESSOR ROBERT F. PATON
PROFESSOR WORTH H. RODEBUSH
DOCTOR LEONARD L. STEIMLEY

Outline of Studies

Major Subject: Physics

Minor Subject: Mathematics

Thesis: THE MAGNETIC ROTATION SPECTRA AND HEATS OF DISSOCIATION OF Li_2, Na_2, AND K_2

Summary

The magnetic rotation spectrum of the green singlet-pi to singlet-sigma band system of Li_2 has been photographed and used to determine the heat of dissociation of the molecule, and the especially designed absorption tube has also made possible accurate determinations of the heats of dissociation of Na_2 and K_2. These new values have been used to calculate the degree of dissociation of these molecules for various temperatures.

EDUCATIONAL CAREER

A.B., DePauw University, 1926

M.S., University of Illinois, 1929

Assistant in Physics, University of Illinois, 1926-1930

Research Assistant in Physics, Engineering Experiment Station, University of Illinois, 1930-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

DANIEL IRVIN RASMUSSEN

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 26, 1932, 10 A. M.
Room 108, Administration Building

COMMITTEE IN CHARGE:

PROFESSOR VICTOR E. SHELFORD, *Chairman*
PROFESSOR LEVERETT A. ADAMS
PROFESSOR ARTHUR G. VESTAL
PROFESSOR HENRY B. WARD
PROFESSOR CHARLES ZELENY

Outline of Studies

Major Subject: Zoology (Ecology)
Minor Subject: Plant Ecology

Summary

1. Four major biotic communities, named for the dominant plants and characteristic, abundant, resident animal species, were found to exist on the Kaibab Plateau.

The Pinus-Juniperus-Neotoma Association, at 5500-6800 feet elevation. (Pinus-Juniperus Woodland Formation).

The Pinus ponderosa-Sciurus kaibabensis Association, at 6800-8200 feet elevation. (Montane Forest Formation).

The Picea-Abies-Sciurus fremonti Association, 8200-9200 feet elevation. (Montane Forest Formation).

The Stipa-Carex Thomomys Associes, 8000-9000 feet elevation. (Small areas of mountain meadows).

2. The population of the communities of mountain forests and meadows is made up of three major components:

a. The vertebrates (birds and mammals) which are present and active throughout the year.

b. The vertebrates that are active seasonally, that migrate, hibernate, or are inactive during unfavorable seasons.

c. The invertebrates.

3. The important adaptations in the life cycles of animals of a mountain are physiological and are shown in hibernation, migration, or inactivity. The life histories of most species are adjusted to the seasonal cycle so that length and time of period of activity and abundance is correlated with favorable season.

a. Length of seasonal activity of animals decreases with increased elevation.

b. The migration of deer cannot be explained on the simple basis of available food.

4. The interference by man in the destruction of animals of major influence in the biotic community has resulted in a change in abundance of a number of both plant and animal species.

a. The killing of predators, especially mountain lions, has been the primary cause in the increase of deer numbers, from 5,000 in 1906 to 100,000 in 1924.

b. The increase of deer numbers has been the cause of a change in the vegetation of the plateau.

c. Man's removal by trapping and hunting in past few years has been a minor factor in the total reduction that has taken place since the peak of numbers in 1924.

EDUCATIONAL CAREER

B.S., Brigham Young University, 1928

M.S., University of Illinois, 1930

Assistant in Zoology, University of Illinois, 1928-1930, 1931-1932

Fellow in Zoology, University of Illinois, 1930-1931

Graduate Student, Scripps Institution of Oceanography, two months 1931

PUBLICATIONS

Southern California Intertidal Communities (in press).

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

FLORA EMMA ROSS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

WEDNESDAY, MAY 25, 1932, 4 P. M.
Room 217, Lincoln Hall

COMMITTEE IN CHARGE:

PROFESSOR ALBERT W. ARON, *Chairman*
PROFESSOR NEIL C. BROOKS
PROFESSOR DAVID H. CARNAHAN
PROFESSOR RÉGIS MICHAUD
PROFESSOR CHARLES A. WILLIAMS

Outline of Studies

Major Subject: German

Minor Subject: French

Thesis: GOETHE IN FRANCE, WITH SPECIAL REFERENCE TO BARRÈS, BOURGET, AND GIDE

Summary

The above title recalls "Goethe en France," by Fernand Baldensperger, a study of Goethean reactions from 1774 to 1904. This thesis, by the intensive research of Goethean traces in three modern French writers, brings the investigation by Baldensperger up to date, in so far as it is possible to generalize from such particular evidences. The conclusions are in part a substantiation of suggestions made by Baldensperger, but covering twenty-eight more years, and in part a discovery of new Goetheisms, not mentioned or foreseen by him.

For Maurice Barrès, Goethe was a constant preoccupation and determinant in his life, Weltanschauung, works, and activities. Goethe's progressive Ego-culture, scientific theories, religion, and aesthetic doctrines brought repeated inspiration to him.

Paul Bourget is not a Goethe-enthusiast, but his reactions reflect the conventional attitudes of the cultured French writer. Especially in his sociological and psychological ideas he finds much sanction and illustration in Goethe.

André Gide expresses the greatest indebtedness to the German poet, displays the keenest and most profound knowledge, the deepest impregnation of his wisdom and works, and resembles him most of any other Frenchman. His aesthetic theories, the significance of the demon in his life and artistic production, his emphasis on the eternally true in art, religion, morals, and life are only a few of the many parallels between him and Goethe.

New reactions to *Faust* and *Werther,* to *Hermann und Dorothea* and *Iphigenie;* original applications of Goethe's wisdom in every conceivable manner to the cherished theories of these authors; inspiration from his life, personality, philosophy, and scientific principles; reconciliation of pagan and Christian ideals, and of classic and romantic art; a neo-classicism, Orientalism, and humanism: these are some of the many evidences of a profound Goethecult. The author of *Faust* has called forth and encouraged various attitudes and ideas which were an inherent part of the temperament of these writers, or the spirit of the times. Thus it is apparent that for certain elite spirits of France Goethe is a more active and vital source of inspiration today than at the beginning of the new century.

EDUCATIONAL CAREER

A.B., James Millikin University, 1910

A.M., Columbia University, 1920

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

LELAND LIVINGSTON SAGE

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

SATURDAY, MAY 28, 1932, 9 A. M.
Room 424, Library

COMMITTEE IN CHARGE:

PROFESSOR ALBERT H. LYBYER, *Chairman*
PROFESSOR JAMES W. GARNER
PROFESSOR PAUL V. B. JONES
PROFESSOR LAURENCE M. LARSON
PROFESSOR THEODORE C. PEASE
PROFESSOR FREDERICK S. RODKEY

Outline of Studies

Major Subject: History

First Minor Subject: History of the Near East

Second Minor Subject: Political Science

Thesis: LORD STRATFORD DE REDCLIFFE AND THE ORIGINS OF THE CRIMEAN WAR

Summary

Stratford Canning, Viscount Stratford de Redcliffe, represented Great Britain at Constantinople seven times between 1808 and 1858. The best known yet most questionable phase of his career was his diplomacy in the controversies which led into the Crimean War.

The Franco-Russian Holy Places' Quarrel, 1850-1852, acquired importance in 1853 when Russia mobilized troops on the Pruth and sent Prince Menshikoff to retrieve the advantage gained by France. Lord Stratford was returned to Constantinople to uphold England's interests.

On his advice the sultan satisfied the original demands of both disputants but refused Menshikoff's additional demand for a treaty of guarantee. Russia suspended relations and announced May 31 that the Principalities would be occupied until satisfaction should be received. That same day the English Cabinet extended Stratford's authority, ordering a fleet to proceed to the Dardanelles to be held at his disposal.

He advised the Porte to protest against Russian occupation instead of declaring war; his government endorsed this advice. His first peace plan was side-tracked for the Vienna Note. Russia accepted this Note; Turkey refused it against Stratford's advice, insisting on amendments which Russia rejected. Russia's real views on the Vienna Note were accidentally published; the English Cabinet pronounced them inacceptable and dropped the Note; the Turks were thus vindicated and the assertion, until now unproved, that Stratford privately advised rejection of the Note, becomes pointless.

The English Cabinet on September 23 ordered Stratford to summon the fleet. When asked by Russia for an explanation its answer was that a state of war had existed since the first Russian soldiers crossed the Pruth. Stratford failed to utilize the orders of September 23 but under those of May 31 summoned the fleet in October. War between Turkey and Russia having begun in the meantime, Nicholas declined to regard the fleet movements as a *casus belli*.

Stratford submitted another peace plan; Austria rejected it, but diplomacy might have secured peace had not the "massacre" of Sinope, perhaps provoked by the Turks, occurred to crystallize both official and public opinion in England and France in favor of war. They adopted a protective attitude over the Turks which made further peace plans useless. Stratford's third and best plan was rejected by Russia. War came in March, 1854, when Russia refused to evacuate the principalities.

To blame Stratford exclusively or principally is to ignore the aggressiveness of Nicholas I and his miscalculation of British policy, the ambitious schemes of Napoleon III, the studied indefiniteness of Francis Joseph which misled Nicholas, the shrewd actions of the Turks seeking Western allies, and the unhesitating support given by the British government to an ambassador who was carrying on its traditional Turkish policy.

EDUCATIONAL CAREER

A.B., Vanderbilt University, 1922

A.M., University of Illinois, 1928

Instructor in History, DePauw University, 1928-1930

Assistant in History, University of Illinois, 1927-1928, 1930-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

RALPH LOUIS SCORAH

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

MONDAY, MAY 30, 1932, 4 P. M.
Room 107, Mechanical Engineering Laboratory

COMMITTEE IN CHARGE:

PROFESSOR JOHN A. GOFF, *Chairman*
PROFESSOR JAKOB KUNZ
PROFESSOR HERBERT F. MOORE
PROFESSOR FRED B. SEELY
PROFESSOR ARTHUR C. WILLARD

Outline of Studies

Major Subject: Engineering (Mechanical)

Minor Subject: Theoretical and Applied Mechanics

Thesis: THE THERMODYNAMICS OF DETONATION WITH APPLICATION TO MIXTURES OF HYDROGEN AND OXYGEN

Summary

When an explosive gas mixture is ignited at the closed end of a tube, the ensuing combustion is propagated as a flame which, after a short period of rapid acceleration, attains a maximum and constant velocity. This constant velocity is found to be a characteristic of the particular explosive mixture and as such should be amenable to thermodynamic analysis. The constant-velocity flame is called normal detonation.

The experimental background and the development of analyses of detonation are briefly reviewed. The best explanation of normal detonation is the hydrodynamic theory which rests on the application to the processes taking place at the wave-front of the principles of (a) conservation of mass, (b) exchange of momentum, and (c) conservation of energy. The application of these principles, however, does not completely define normal detonation but admits possible velocities ranging from a certain minimum value to infinity. This state of minimum velocity is shown to be further characterized as follows: (a) the burned gases are discharged from the wave front at exactly the acoustic velocity of these burned gases, (b) the increase of entropy involved is a minimum, and (c) the available energy is dissipated at a minimum time rate. On the basis of one or more of these facts, this state of minimum velocity has been postulated as the state of stability characteristic of normal detonation, but it is shown that this procedure is little more than a convenient hypothesis justified mainly by the success it has achieved. Using this stability postulate, equations have been arranged for considering either complete combustion or chemical equilibrium within the detonation wave.

The detonation velocities predicted by the hydrodynamic theory for mixtures of hydrogen and oxygen are in good agreement with the experimental values. The effect of the dissociation of hydrogen and water vapor is always small, sometimes decreasing and sometimes increasing the computed detonation velocity but always in the direction of better agreement with the experimental velocities. The theoretical detonation limits based on compression ignition data are in good agreement with the experimental detonation limits.

EDUCATIONAL CAREER

B.S., Purdue University, 1924

M.S., Purdue University, 1925

Assistant in Mechanical Engineering, University of Illinois, 1929-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

PAUL RUSSELL SHILDNECK

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Saturday, May 14, 1932, 9 a.m.
Room 176, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR ROGER ADAMS, *Chairman*
PROFESSOR REYNOLD C. FUSON
PROFESSOR CHARLES T. KNIPP
PROFESSOR CARL S. MARVEL
PROFESSOR WORTH H. RODEBUSH

Outline of Studies

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: STEREOCHEMISTRY OF DIPHENYLBENZENES

PREPARATION AND PROPERTIES OF CERTAIN BROMINATED DIMESITYL-HYDROQUINONES AND THEIR DERIVATIVES

Summary

1. 2, 5–Diisodurylhydroquinone was prepared. Only one of the two theoretically possible forms was isolated. Resolution of its diacetic acid derivative was attempted through the morphine salt. The salt was a single substance.

2. Meso and racemic forms of 2, 5–di–(3–bromo–2, 4, 6–trimethyl–phenyl)–3, 6–dibromohydroquinone were prepared. Proof that the forms are stereoisomers rather than structural isomers is given.

3. Meso and racemic forms of 2, 5–di–(3–bromo–2, 4, 6–trimethyl–phenyl)–3, 6–dihydroxyquinone were prepared from the corresponding dibromoquinones. The β–form of the dihydroxyquinone and its diacetate and dibutyrate were converted into the corresponding α–forms by refluxing in a high-boiling solvent. Similar treatment did not affect any of the other β–derivatives.

4. Polyporic acid and atromentin dimethyl ether were prepared by new procedures in good yields.

EDUCATIONAL CAREER

B.S., University of Nebraska, 1928

M.S., University of Nebraska, 1929

Assistant in Chemistry, University of Illinois, 1929-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

DANIEL TELL SIGLEY

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

FRIDAY, MAY 13, 1932, 4 P. M.
Room 254, Mathematics Building

COMMITTEE IN CHARGE:

PROFESSOR GEORGE A. MILLER, *Chairman*
PROFESSOR ROBERT D. CARMICHAEL
PROFESSOR ARNOLD EMCH
PROFESSOR JAKOB KUNZ
PROFESSOR ALFRED J. MARIA

Outline of Studies

Major Subject: Mathematics (Algebra)
First Minor Subject: Geometry
Second Minor Subject: Physics

Thesis: GROUPS INVOLVING A SMALL NUMBER OF COMPLETE SETS OF CONJUGATES

SUMMARY

The number of complete sets of conjugate non-invariant operators in a group having a central of order greater than 1 and having a central quotient group involving k, $k > 0$, complete sets of non-invariant conjugate operators, exceeds k. The order of a group involving k, $k > 0$, complete sets of conjugate non-invariant operators has a finite upper limit depending on k. With the aid of these results we find that there are exactly eight groups involving five complete sets of conjugate non-invariant operators. A solvable group G involving k complete sets of conjugate operators, contains an invariant abelian subgroup, one of a series of successive commutator subgroups of G, the quotient group of which is one of the solvable groups involving less than k complete sets of conjugate operators or an abelian group of order less than k. There are exactly six solvable groups involving six complete sets of conjugate operators, and exactly eleven solvable groups involving seven such sets.

EDUCATIONAL CAREER

A.B., University of Kansas, 1927

A.M., University of Kansas, 1928

Assistant in Mathematics, University of Illinois, 1928-1931

Fellow in Mathematics, University of Illinois, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

ROGER WOLCOTT STOUGHTON

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

MONDAY, MAY 16, 1932, 9 A. M.
Room 176, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR ROGER ADAMS, *Chairman*
PROFESSOR GEORGE L. CLARK
PROFESSOR REYNOLD C. FUSON
PROFESSOR CHARLES T. KNIPP
PROFESSOR WORTH H. RODEBUSH

Outline of Studies

Major Subject: Chemistry (Organic)

First Minor Subject: Physical Chemistry

Second Minor Subject: Physics

Thesis: THE STEREOISOMERISM OF 2, 2′, 6-TRISUBSTITUTED DIPHENYLS

Summary

It is expected that optical isomerism in diphenyls is due to the restriction of rotation of the rings by the ortho substituants. If this is due to the mechanical blocking of these groups the stability of the active forms should depend upon their size. A study of the stability of trisubstituted diphenyls has been made in order to determine the effective size of various groups. For this purpose a series of compounds were prepared, substituted with the following groups; nitro, carboxy and X, where X was fluorine, chlorine, bromine or methyl.

2-Methyl-6-nitro-2′-carboxydiphenyl was resolved and found to be quite stable towards racemization. No active form of 2-nitro-6-carboxy-2′-fluoro-5′-methyldiphenyl was isolated but evidence was presented that at zero degrees an active form exists even though it racemizes rapidly. 2-Nitro-6-carboxy-2′-chloro-5′-methyldiphenyl and 2-nitro-6-carboxy-2′-bromo-5′-methyldiphenyl were both resolved. The chlorine compound racemized quite easily in boiling solvents but the bromine compound was only very slightly changed on prolonged heating. The active acid obtained from 2-nitro-6-carboxy-2′-methoxydiphenyl was found to racemize rapidly at room temperature when in solution. In all cases racemization proceeded faster when the acid was dissolved in solvents which form an unionized carboxyl group.

These results seem to indicate that these groups should be placed in the following order in preventing the free rotation of the benzene rings in diphenyls; fluorine, methoxyl, chlorine, methyl, and bromine.

EDUCATIONAL CAREER

B.S., Middlebury College, 1927

M.S., Middlebury College, 1928

Assistant in Chemistry, University of Illinois, 1928-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

GEORGE EDGAR SYMONS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

WEDNESDAY, MAY 18, 1932, 3 P. M.
Room 60, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR ARTHUR M. BUSWELL, *Chairman*
DOCTOR JOHN C. BAILAR
PROFESSOR REYNOLD C. FUSON
PROFESSOR DONALD B. KEYES
PROFESSOR FRED W. TANNER

Outline of Studies

Major Subject: Chemistry (Sanitary)

Minor Subject: Bacteriology

Thesis: THE ANAEROBIC BACTERIAL HYDROLYSIS OF CARBOHYDRATES

Summary

The methane fermentation appears to be an hydrolysis catalyzed by bacteria. This reaction has been shown to follow a simple equation that may be written for compounds of carbon, hydrogen, and oxygen as follows:

$$C_nH_aO_b + \left(n - \frac{a}{4} - \frac{b}{2}\right) H_2O \rightarrow \left(\frac{n}{2} - \frac{a}{8} + \frac{b}{4}\right) CO_2 + \left(\frac{n}{2} + \frac{a}{8} - \frac{b}{4}\right) CH_4$$

The mechanism is indicated to be an oxidation on the alpha carbon atom with water as the oxidizing agent. Acids and hydrogen are intermediates and carbon dioxide is evolved from the decarboxylation of alpha keto acids. The hydrogen and some of the carbon dioxide combine to form acetic acid which is the immediate precursor of the methane obtained in the fermentation.

Forty-five substances of the following types of compounds were subjected to the fermentation: (1) carbohydrates, including mono-, di-, tri-, and poly-saccharides of both ketose and aldose structures, (2) alcohols, including mono-, di-, tri-, and hexa-hydric types and isomeric forms of the first type, (3) acids, including mono- and di-basic, hydroxy and keto types, (4) ketones, (5) aldehydes, (6) ethers, and (7) hydrocarbons. Only the latter two types were indicated to be unfermentable.

Thirty-eight substances distributed among the other types mentioned were fermented to give methane and carbon dioxide in the proportions predicted by the above equation. There are two favorable temperatures, (33-35 and 58-60 deg. C) and the reaction is the same at both temperatures.

A more general equation has been developed for application to all types of organic compounds.

EDUCATIONAL CAREER

B.S., University of Illinois, 1928

M.S., University of Illinois, 1930

Assistant in Chemistry, University of Illinois, 1929-1932

PUBLICATIONS

1. Buswell and Symons—
   A New Method for Determination of Settling Solids. A Method for the Determination of Sludge Drainability. Sew. Wks. Jour. *2* 378-384, (1930).
2. Buswell and Symons—Solids Balance. Ill State Water Survey Bull. 29—1930. Part II.
3. Hatfield, Symons and Mills—Gases from Sewage Sludge Digestion. Ind. Eng. Chem. *20*, 174, (1928).
4. Symons and Buswell—The Biochemical Oxygen Demand of Certain Substances. Ind. & Eng. Chem. Anal. Ed. *1*, 161, (1929).
5. Symons and Buswell—The preparation and Biochemical Oxygen Demand of Pure Sodium Soaps. Ind. & Eng. Chem. *24*, 460, (1932).

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

LAWRENCE CLIFFORD THOMAS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Friday, January 29, 1932, 3 p. m.
Room 331, New Agriculture

COMMITTEE IN CHARGE:

PROFESSOR HENRY P. RUSK, Chairman
PROFESSOR ARTHUR R. CRATHORNE
PROFESSOR ELMER ROBERTS
PROFESSOR WALDO SHUMWAY
PROFESSOR CLYDE M. WOODWORTH
PROFESSOR CHARLES ZELENY

Outline of Studies

Major Subject: Animal Husbandry (Animal Genetics)

First Minor Subject: Experimental and Comparative Embryology

Second Minor Subject: Statistics

Thesis: FERTILITY AND OESTRUM IN THE RAT

Summary

The main purpose of the investigation was to determine the relation between the fertility of a female and the age at which she becomes sexually mature, in order, if possible, to find an index that might be useful in selecting for fertility. The conclusions are based on the complete breeding records of 141 female rats which produced altogether 880 litters with a total of 5564 young.

A study of the data shows that a female can realize her full productive capacity if mated at sexual maturity and bred continuously, allowing the young to nurse no longer than three weeks, or by mating at physical maturity and removing the young at birth. The studies show also that the first mating, establishment of vaginal orifice and first heat are of practically the same value in judging sexual maturity, and it is further shown, using total number of young produced as the standard measure of fertility, that number of litters produced is the next best measure of fertility, with length of productive period and average size of litter following in the order named. The size of the first litter is not a measure of fertility, although there is a high correlation between it and average size of litter. No relation was found to exist between fertility and the age at which a female becomes sexually mature.

EDUCATIONAL CAREER

B.S., Ottawa University, 1919

M.S., Kansas State Agricultural College, 1926

Assistant in Animal Genetics, University of Illinois, 1926-1930

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CARL DENISON THOMPSON

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

TUESDAY, NOVEMBER 29, 1932, 3 P.M.
Room 176, Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR CARL S. MARVEL, *Chairman*
PROFESSOR REYNOLD C. FUSON
PROFESSOR DONALD B. KEYES
PROFESSOR WORTH H. RODEBUSH
DOCTOR LEONARD L. STEIMLEY

Outline of Studies

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Mathematics

Thesis: I. THE POLYMERIZATION OF OMEGA HALOGENATED TERTIARY ALIPHATIC AMINES

II. SYMMETRICAL DI-TERTIARY-BUTYL-DI-TERTIARY-BUTYLETHINYLDIPHENYLETHANE

I. Summary

1. Omega-bromononyldimethylamine and omega-bromodecyldimethylamine have been synthesized and allowed to polymerize under various conditions.

2. The products were found to be linear polymers and not the cyclic type.

3. The average number of units in the polymeric molecule calculated from analytical data was found to be 18 to 28.

II. Summary

1. The synthesis of symmetrical di-tert.-butyl-di-tert.-butylethinyldiphenylethane has been carried out successfully together with the isolation and purification of an isomeric hydrocarbon.

2. The action of heat on phenyl-tert.-butyl-tert.-butylethinylmethyl chloride has produced a substance thought to be an intermediate in the formation of a rubrene type of molecule.

EDUCATIONAL CAREER

A.B., Lawrence College, 1928

Assistant in Chemistry, University of Illinois, 1928-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

KATHARINE SYBIL TUBBS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Saturday, May 7, 1932, 9 a.m.
Room 108 Lincoln Hall

Committee in Charge:

Professor William A. Oldfather, Chairman
Professor Herbert J. Barton
Professor Howard V. Canter
Professor Glenn R. Morrow
Doctor George E. Mylonas

Outline of Studies

Major Subject: Classics (Greek)
First Minor Subject: Latin
Second Minor Subject: Ancient History

Thesis: THE GREEK VERSIONS OF JEROME'S LIFE OF SAINT PAUL OF THEBES

Summary

1. Version *a* is a fairly close translation of the original Life of Saint Paul of Thebes by Jerome.

2. The ten Greek MSS of *a* are divided into four groups.

3. Version *b* is an abridgment and simplification of *a*.

4. Quotations from version *b* in Eustratius set the date of this version at sometime before the middle of the sixth century.

5. Version *b* was translated into Syriac and Coptic, abridged into short Arabic and Coptic versions, and enlarged into Ethiopic and Arabic Synaxaria.

6. Three of the five Greek MSS of *b* are not closely related.

7. Version *b* is of great importance in the reconstruction of *a*.

8. Version F is a paraphrase of *a*.

9. Symeon Metaphrastes probably composed version F in the latter half of the tenth century.

10. The 34 collated MSS of F fall into two distinct groups and several sub-groups: MSS which contain several paraphrases and interpolations, and MSS which are comparatively faithful to the archetype.

11. Version M, markedly abbreviated, was derived from *a*, and is found in two Greek MSS.

12. The archetype of M was full of grammatical errors.

13. Version N, found in two late Greek MSS, was derived from *a* and *b*, the scribe taking great liberties with his model.

14. Versions F, M and N are of importance in a few passages for the reconstruction of *a*.

EDUCATIONAL CAREER

A.B., Bates College, 1928

A.M., University of Illinois, 1930

Assistant in Latin, Bates College, 1927-1928

Taught Latin and English in High School at Newport, New Hampshire, 1928-1929

Scholar in Classics, University of Illinois, 1929-1930

Fellow in Classics, University of Illinois, 1930-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

OSCAR EMIL WAGNER, JR.

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

WEDNESDAY, MAY 25, 1932, 3 P. M.
Room 134, Natural History Building

COMMITTEE IN CHARGE:

PROFESSOR THOMAS E. SAVAGE, *Chairman*
PROFESSOR WILLIAM S. BAYLEY
PROFESSOR FRANK W. DEWOLF
PROFESSOR WALDORF V. HOWARD
PROFESSOR ARLE H. SUTTON
PROFESSOR HARLEY J. VAN CLEAVE

Outline of Studies

Major Subject: Geology

Minor Subject: Zoology

Thesis: THE PALEONTOLOGY AND STRATIGRAPHY OF THE KAIBAB LIMESTONE

Summary

The purpose of this investigation was to study the Kaibab limestone of northern Arizona, southern Utah, and southern Nevada stratigraphically and paleontologically with a view toward correlating it with other Permian formations of the United States, and determining its position in the Permian section.

This limestone forms the rim rock of the Grand Canyon of the Colorado River and is extensively exposed as the capping of the high plateaus of northern Arizona. It was first described by Marcou in 1855 and the first fossils collected from it were described by Newberry in 1861. The name "Kaibab limestone" was applied to it in 1910 by Darton.

The Kaibab limestone in most places passes by gradation down into the Coconino sandstone below and is overlain disconformably by the Moenkopie formation of Triassic age.

At the type locality in Kaibab Gulch, Utah, the limestone is 717 feet thick. It thickens to the west and thins eastward, northward, and southward and evidently was deposited in a sea which advanced from the west.

The fauna of the Kaibab limestone consists of 74 species belonging to 55 different genera. The genus Phylloporella is here described for the first time. Twenty-five new species are described. These are Lophophyllum multiseptatum, Serpulopsis flexuosa, Meekopora peristomata, Stenopora culbertsoni, Phyllopora irregularis, Phylloporella savagei, Septopora scalariformis, Rhipidomella tusayani, Chonetes kingi, Chonetes kaibabensis, Productus suttoni, Waagenoconcha kaibabensis, Dielasma reversa, Composita maricopensis, Aviculipecten triplicatus, Solenomya cosninoensis, Parallelodon obliquus, Parallelodon oblongus, Pteria mogollonensis, Myalina arizonensis, Schizodus verdensis, Allerisma griffini, Pleurophorus obliquicostatus, Bairdia brevirostrata, and Cytherella bellemontensis.

The fauna is divided into two faunal facies or faunules, the Productus ivesi faunule below and the Schizodus verdensis faunule above. The latter term is proposed for the part of the fauna hitherto designated as the "Bellerophon fauna."

The Kaibab limestone is correlated with the Word formation of the Glass Mountains of Texas, and with the upper part of the Naco limestone of the Chiricahua Mountains of southeastern Arizona and is upper Middle Permian in age.

EDUCATIONAL CAREER

A.B., University of Illinois, 1928

A.M., University of Illinois, 1929

Assistant in Geology, University of Illinois, 1928-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HAROLD HOLLIDAY WATTS

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

FRIDAY, MAY 27, 1932, 1:30 P. M.
Room 108, Administration Building

COMMITTEE IN CHARGE:

PROFESSOR ERNEST BERNBAUM, *Chairman*
PROFESSOR WALTER J. GRAHAM
PROFESSOR HARRY S. V. JONES
PROFESSOR RÉGIS MICHAUD
PROFESSOR JACOB ZEITLIN

Outline of Studies

Major Subject: English
First Minor Subject: Philology
Second Minor Subject: French

Thesis: THE INTELLECTUAL AND ARTISTIC DEVELOPMENT OF LORD LYTTON

Summary

1. Previous study of Lytton has neglected the tracing of his intellectual development. This neglect has resulted in misunderstandings of the novelist's artistic development and in misstatements concerning it.

2. Lytton's intellectual development, as it is shown in his voluminous non-fictitious writings, is characterized by the qualities of unity, sustained purpose, and vitality.

3. There is a close relationship between Lytton's intellectual development and his artistic development.

4. Lytton's novels are not mere efforts to please the taste of the public. All of them represent conscious effort to give artistic form to concepts Lytton had arrived at in his intellectual development.

5. Lytton's artistic failures are not the result of his subservience to influences and his lack of individuality. They are the result of too strict an application of artistic theories he had evolved in the course of his intellectual development.

6. Lytton's artistic successes are also a result of conscious application of artistic theories he held. The extent and nature of this success differs greatly from the description previous critics have given it.

EDUCATIONAL CAREER

A.B., University of Illinois, 1927

A.M., University of Illinois, 1928

Scholar in English, University of Illinois, 1927-1928

Fellow in English, University of Illinois, 1928-1929, 1931-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

HAROLD KENNETH WILSON

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

THURSDAY, MAY 26, 1932, 1 P. M.
Room 120, Old Agriculture

COMMITTEE IN CHARGE:

PROFESSOR HARRISON A. RUEHE, *Chairman*
PROFESSOR SIMON LITMAN
PROFESSOR OLIVER R. OVERMAN
PROFESSOR MARTIN J. PRUCHA
PROFESSOR NATHAN A. WESTON

Outline of Studies

Major Subject: Dairy Husbandry

Minor Subject: Economics

Thesis: FACTORS AFFECTING THE MARKETABILITY OF FLUID MILK

Summary

Trends in the population changes in the United States, as shown by 1930 census data, have had a two-fold effect upon the fluid milk industry. The rapid increase in urban population has provided a corresponding increase of potential consumers of market milk. The shift of population from more remote districts to the vicinity of large urban centers has increased the demand for land near the cities for uses other than the production of milk. This has caused fluid milk supplies to be produced farther from the cities.

According to census data and estimates made by the Bureau of Agricultural Economics, the percentage increase in the number of dairy cows in the United States since 1900 has been less than the percentage increase in human population and greater than the percentage increase in land in farms. It is possible by increasing the production per cow, the size of herds, and adjustment of the season of production to meet the increased demand for fluid milk without increasing either the number of dairy farmers or the area within which the milk is produced. Truck transportation of milk favors more intensive production of milk within a radius of approximately 75 miles from the large cities.

The present status of legal control of the fluid milk business was determined by an analysis of dairy laws from 44 states and milk ordinances from 105 cities together with replies from 143 milk dealers, and 332 Chambers of Commerce. With increased supervision of milk supplies, there has been to a certain extent, an increase in the per capita consumption of milk. However, per capita consumption has been relatively low in some cities and states which have had very strict supervision. It has been suggested that this low consumption may be due to relatively high prices and undesirable flavor defects. Other factors influencing per capita income have been race and nationality, customs, per capita income, and advertising.

Standards and practices of legal supervision were shown to be correlated with scientific knowledge concerning quality in milk. Information concerning quality in milk was based upon laboratory work performed by the author and material from numerous secondary sources. Suggestions were made pertinent to the improvement of the quality of fluid milk supplies.

EDUCATIONAL CAREER

B.S., University of Illinois, 1929

M.S., University of California, 1930

Special Research Assistant in Dairy Husbandry, 1930-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JOHN BASCOM WOLFE

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Wednesday, May 18, 1932, 2 p.m.
Room 420, University Hall

COMMITTEE IN CHARGE:

PROFESSOR HERBERT WOODROW, *Chairman*
PROFESSOR GLENN D. HIGGINSON
PROFESSOR MATTHEW T. MCCLURE
PROFESSOR GUY A. TAWNEY
PROFESSOR PAUL T. YOUNG

Outline of Studies

Major Subject: Psychology

First Minor Subject: Comparative Psychology

Second Minor Subject: Philosophy

Thesis: THE EFFECT OF DELAYED REWARD UPON LEARNING IN THE WHITE RAT

Summary

Rewards have from the beginning of recorded history been recognized as one of the main instrumentalities for the control of all animals, including man. An act rewarded in the past tends to be repeated the next time the organism is confronted with a choice between the one previously rewarded and others which were previously unrewarded. The object of the present investigation was to determine how this effectiveness of reward in bringing about learning is affected by delaying the reward, that is, by inserting an interval of time between the rewarded act and the reward itself. Using white rats as subjects, and food as the reward, it was desired definitely and accurately to ascertain the relationship between the length of delay and the effectiveness of reward as a learning-producing agency.

The effect of delay of reward was studied in two situations, which were alike in that each permitted the rat to choose between two courses of action, but which were quite different as regards the "cue" which the rat must follow if he were ever to learn always to choose the rewarded act. One of the situations was a single-T maze, and the other was a black-white discrimination-box. With the maze, the procedure was as follows: A rat upon being released from the starting box was allowed to proceed down the choice alley and select either of the two pathways, one of which led to food and the other to no food. Immediately after he had made his choice he was delayed for a definite length of time, then he was allowed to proceed on to reward or no reward. Delays of 0, 5, and 30 seconds, and of 1, 2½, 5, 10, and 20 minutes were used. The effect of these delays upon learning was measured by determining in the case of each delay in what percentage of 50 trials the rat chose the "correct" pathway, i.e., the one leading to reward. A different group of rats was used with each delay. The curve showing the change in percentage of correct trials with change in the delay was plotted in order to picture the general relationship between the length of delay and the effectiveness of reward.

With the discrimination-box, the procedure was essentially the same. In this case, however, the rat had to choose between a pathway covered by a white screen and one covered by a black one.

In the case of both situations it was found that as the reward was delayed, it decreased in effectiveness with extreme rapidity. The greater portion of its effectiveness was lost with a delay of less than 1 minute, but not until after 10 minutes was all effectiveness gone. The investigation made use of 128 white rats which were run a total of 9,600 trials.

EDUCATIONAL CAREER

A.B., Emory and Henry College, 1925

A.M., University of Virginia, 1928

Assistant in Psychology, University of Illinois, 1930-1932

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

EUGENE HURLBUT WOODRUFF

FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

Saturday, February 13, 1932, 9 a. m.
Room 176 Chemistry Building

COMMITTEE IN CHARGE:

PROFESSOR ROGER ADAMS, Chairman
PROFESSOR REYNOLD C. FUSON
PROFESSOR JOHN H. REEDY
PROFESSOR WORTH H. RODEBUSH
PROFESSOR FRED W. TANNER

Outline of Studies

Major Subject: Chemistry (Organic)

First Minor Subject: Physical Chemistry

Second Minor Subject: Bacteriology

Thesis: THE PREPARATION AND RESOLUTION OF 2, 2′, 4, 4′ – TETRACARBOXY–6, 6′ – DIPHENYL –3, 3′–DIPYRIDYL

Summary

The extension of the study of optical isomerism as it exists in the diphenyl series to other bi-nuclear ring systems has been extended here to the –C–C– linked dipyridyls. A o–tetracarboxy dipyridyl has been prepared and its resolution accomplished by means of the di–brucine salt. The active acids have a rotation of $[\alpha]_0 + 5.9°$ and $[\alpha]_0 - 6.1°$. Contrary to predictions made upon the basis of data applicable in the diphenyl series, the active acids were easily racemized by boiling alcohol.

EDUCATIONAL CAREER

A.B., Grinnell College, 1926

Assistant in Chemistry, University of Illinois, 1927-1931